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OUR country has sustained a heavy loss by the untimely death of His Royal Highness the DUKE OF CLARENCE, on January 14th, and all loyal subjects sympathise deeply with our beloved Queen, the Prince and Princess of Wales, and the other members of the Royal Family who suffer from this distressing bereavement.

THE SUPPOSED DANGER IN CONSUMING THE MILK AND FLESH OF ANIMALS AFFECTED WITH TUBERCULOSIS.*

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THE great majority of investigators are agreed that the principal source of tuberculosis in man is to be found in man himself, but nearly all likewise admit that he may contract the disease by consuming the milk and flesh derived from tuberculous animals. The question then before us has a real value. It has been dealt with many times, no doubt, at every medical and hygienic international congress, and yet the subject is not exhausted. There is a consensus of opinion as to the existence of such danger, but there is not unanimity as to its extent. Starting from an absolute point of view, it might be said that this question of intensity of danger has no value, and that if there were in reality any danger to the health of man in the consumption of the flesh and milk of tuberculous animals, it would be necessary to altogether interdict the use of these products without regarding the degree of danger.

This manner of looking at the matter is very seductive, and it was that which was followed at the first Congress assembled at Paris in 1888, for the Consideration of Tuberculosis, and at which a very large majority voted for the seizure and total destruction of all flesh from tuberculous

* A paper read at the Congress of Hygiene and Demography, held in London, in August, 1891.

animals, no matter what might be the gravity of the specific lesions found in these animals. And in the same year, a decree of the President of the French Republic simply prohibited the sale and use of the milk from cows affected with tuberculosis.

I agree with the logic of this reasoning, so much in harmony with French ideas; but, on the other hand, it must not be forgotten that the application of such severe measures will cause enormous national loss to those countries in which the disorder is very prevalent in the bovine race. It is well known that the Germans, for instance, have always refused to adopt such measures. For myself, I confess I regard the application of the French measures as impossible—at least for the moment—in countries in which tuberculosis is widespread, and, besides, they do not seem to me to be necessary.

It is, therefore, imperative to study the extent of the danger.

The Milk.

So far as the milk is concerned, the prophylactic problem in regard to it might seem very easily solved if it were ordained, "never use milk without boiling it." But how is protection to be secured against the products of the milk?

The experiments made by Galtier* and by myself,† by Heim,‡ and Gasperini,§ prove that the diverse products of milk—butter, cheese, and skim-milk—may contain Koch's bacilli, and that these can preserve their vitality in such products for from fourteen to thirty days, and sometimes even longer; according to Galtier, they retain their vitality for more than ten months in cheese, and Gasperini says for 120 days in butter.

We may, it is true, eliminate the greater number of the milk bacilli from the cream if this be separated by means of the centrifugal machine before the milk is churned—as is usually done in Denmark; but if the milk is very rich in bacilli, some will remain in the cream.

To get rid of all the danger that is supposed to be connected with milk products, and especially with butter, it

* Compte Rendues et Mémoires du Congrès pour l'Etude de la Tuberculose. Paris, 1889.

† 4 Beretning. fra den Kgl. Vetr. og Landbohöjsk. Laborat. for landökon. Forsög, 1885. Deutsche Zeitschrift für Thiermediun u. Vergl. Pathologie. Band. xvii., 1890.

‡ Arbeiten a. d. Kaiserl. Gesundheitsamt. Berlin, 1889.

§ Il. Burro Naturale come. Mezzo di Transmissione della Tuberculosi. Milano, 1890.

would be necessary to expose the milk or cream, before making it into butter, to a temperature sufficiently high to kill the tuberculosis bacilla. My experiments demonstrate to me that heating to 85° Centyrade—and even sometimes to 80°—kill these bacilli; while 70° — sometimes 60° — so weakens the virus that it will not produce infection through the digestive organs.* This pastorization of the cream has within the last few years been more and more employed in my country, and particularly because this method eliminates at the same time a good number of other faults in the butter.

Nevertheless, this method of preliminary heating cannot be immediately employed everywhere, and, with regard to the milk itself, I believe it will be a long time before people become accustomed to the use of boiled milk, as many do not like the taste of it. It will, therefore, always be interesting to know if, in reality, the milk of phthisical cows is dangerous in the majority of cases.

In this direction I have made many experiments; the results of the majority of these I communicated to the first Congress on Tuberculosis†, and to the International Medical Congress at Berlin.‡ When the udder is affected the milk always (generally) contains a somewhat large number of bacilli, and, consequently, it is very dangerous. But Tuberculosis of the udder is not so extremely common as was at one time imagined. At the Copenhagen abattoir, for instance, it was seldom found in a little more than 1 per cent. of phthisical cattle.

The following is a summary of the investigations I have already published on the virulence of the milk secreted by a cow affected with generalised Tuberculosis, but the mammæ of which was healthy:—

I inoculated the milk of twenty-eight such cows into forty-eight rabbits, and of these only two gave evidence that the milk was virulent. After this I inoculated forty guinea-pigs with the milk of twenty-one phthisical cows, and in four there was evidence that the fluid possessed virulent properties. Recently I have made a new series of such researches, comprising the milk of fourteen extremely phthisical cows and twenty-eight guinea-pigs inoculated with it; on this occasion the result was a little more unfavourable, as the milk was shown to be viruliferous in three cases. The result of all my

* 4. Beretning. Deutsche Zeithschr. f. Thiermedicin u. Vergl. Pathologie. Band. xviii.

† J. Comptes Rendus et Mémoires du Congres, 1889.

‡ Nord. Med. Arkiv., 1890.

experiments is that, of sixty-three tuberculous cows, I found nine the milk of which had virulent qualities.

These figures do not, perhaps, appear very re-assuring; but then it must be remembered that nearly all the cows were affected to a very serious degree, while some of them had, in reality, a tuberculous affection of the udder, though not sufficiently developed, it is true, to be discovered in the living animal, as I found it to be in three of the four positive cases in my second series. Others exhibited acute miliary tuberculosis of different organs—a condition only rarely observed in a cow giving milk.

In another instance I found the supra-mammary lymphatic glands affected with tuberculosis, although I was unable to discover any lesions of the disease in the udder itself.

In several of my positive cases the number of bacilli in the milk must have been very small, as only one of the two guinea-pigs inoculated was affected, as I have also found in one case of my second series, and in two of my third series.

I should add that the quantity of milk injected was greater in my last series than in the previous ones. In the first two series I only injected 1 to 3 cubic centimetres, and in the last 5 to 10. And by chance the larger quantity was injected into the negative cases.

Although my last series of experiments gave a few more positive cases than the others, I still think I must maintain the opinion already expressed, that the milk of a phthisical cow, with an apparently healthy udder, is not dangerous in the great majority of cases. It is so, no doubt, in some instances, and consequently it is always to be *suspected*. It is necessary, therefore, to adopt prophylactic measures against its alimentary use; but there is no occasion to exaggerate the danger, as has been sometimes done.

The Flesh.

The flesh itself only contains tubercles in very rare cases. Nevertheless it has been proved by numerous experiments that the muscle juice may have the bacilli of tuberculosis; though those of Chauveau and Arloing, of Peuch, Galtier, Nocard,* and Kastner,† that the positive cases are absolutely in the minority. Among 73 phthisical cows, these

* *Comptes Rendus et Memoirs du Congres pour l'Etude de la Tuberculose, Paris*, 1889.—*Journal de Médécine Vetérinaire et de Zootechnie, Lyons, January*, 1891.

† *Münchener Medic. Wochenschrift*, 1889, Nos. 34, 35.

authorities only found ten, the juice of whose flesh proved virulent when injected into rabbits or guinea pigs, and sometimes the juice inoculated only produced the disease in one of several animals so inoculated. The very interesting experiments which Nocard described to the first congress on tuberculosis explains the inconsistency of the results obtained. When he had injected into the ear-vein of rabbits a culture very rich in bacilli, he only found the muscle juice of these animals virulent when they were killed during the five first days after inoculation; so that the bacilli carried into the vessels of the muscles preserved their vitality only during five days. If to this experimental result be added the observation already alluded to, that tubercles are scarcely ever developed in the muscular tissue, although the bacilli are doubtless often introduced into the muscle vessels during the development of generalised tuberculosis, it must be concluded that the muscular tissue is a substratum so unfavourable for the bacilli that they cannot multiply in it. The number of bacilli that may be found in the flesh of tuberculous animals must then be always very limited.

It is very true that, as Arloing and Nocard have objected, the circulatory system of a tuberculous animal must receive an injection of bacilli every instant, and consequently a few minutes perhaps before the creature is killed. But it must not be overlooked, that it is only in the cases in which an acute miliary tuberculosis is developed, that we may suppose the number of bacilli introduced into the vessels to be considerable. In ordinary cases, in which tuberculosis is developed slowly, the bacilli will be thrown into the blood in very small doses; so that the number of bacilli that may be found in the flesh at a given moment will be very small. And the experiments of Galtier,* Gebhardt,† and others would tend to show that it is less likely that infection is less readily accomplished through the digestive organs than by injection, and that the number of bacilli introduced has a considerable influence on the result obtained.

Personally, I have not studied the effects of the flesh of

* *Journal de Méd, et de Zootechnie, Lyons,* January, 1891. The following is the conclusion Galtier draws from his experiments: "It seems, then, that the injection of the flesh of phthisical animals, with the exception of diseased organs and glands, should not be dangerous. I consequently believe, until there is proof to the contrary, that we will act wisely in deciding that there is no necessity for condemning the flesh of animals which are only slightly affected with Tuberculosis, and that it is sufficien to seize all the organs attacked."

† *Virchow's Archiv. Band.* 119, 1890.

tuberculous animals, but I have recently completed a series of experiments with regard to the virulence of the *blood* of extremely tuberculous cows—a matter closely related to that now under discussion. I have inoculated 38 rabbits and 2 guinea-pigs with defibrinated blood of 20 cows. The inoculation was made into the peritoneum, and the dose varied in the majority of the experiments, between 10 and 18 cubic centimetres.

The results were negative in 18 cases and positive in two. And of these two, only one of the rabbits offered marked tubercular lesions, these being very insignificant in the other. The cow from which the virulent blood was obtained wherewith to inoculate the first case was attacked with acute miliary Tuberculosis after having received an injection of tuberculin. Three weeks previously I had inoculated with the blood of this same cow, and it was then inoffensive. It may be added that among the negative cases there were several of acute miliary Tuberculosis.

Relying on these experiments and on the reflections to which they give rise, I arrive at the conclusion that the condemnation of the flesh of every tuberculous animal is too severe a measure. So long as the disease is really localised, the flesh may offer no danger. When it is generalised, however, the consumption of such flesh may be dangerous, although it may not be so always. It is, therefore, limited condemnation that should be adopted, or rather maintained, as it is that which is at present most generally resorted to.

A well-regulated system of meat inspection not being established everywhere, in order to diminish the danger that may be incurred through the use of tuberculous meat, the conclusion formulated by Vallin* at the International Congress on Hygiene at the Hague, should be observed: It is necessary to restrain, instead of encouraging, the habit of eating underdone meat.

Before concluding, I should like to remark that the best means of eliminating danger to mankind—a danger of which we have always spoken—is to combat in every possible way, by isolation, slaughter, etc., the propagation of Tuberculosis among the domesticated animals.

* Archives Veterinaires, 1884.

THE "CORN-STALK" DISEASE IN CATTLE;

And the so-called Pleuro-pneumonia Contagiosa in an American Ox.

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THE recent developments in regard to the *so-called* pleuro-pneumonia contagiosa found in an American ox slaughtered at Deptford last year, as well as the appearance of a malady in France from the same country, fully described in the VETERINARY JOURNAL, and which M. Nocard thinks identical with the "corn-stalk" disease of the Western States of America, and described by Dr. Billings in Nebraska, has led to considerable discussion; and as the matter is yet an open question, it is my intention to give extracts from Dr. Billings' investigations on the "corn-stalk" disease in Nebraska, and at the same time produce some evidence that the American ox slaughtered at Deptford (and condemned as affected with pleuro-pneumonia contagiosa) was not affected with that bovine scourge, but with broncho-pneumonia, as stated by principal Williams, whose testimony is supported by Dr. James Hunter and myself.

The "corn-stalk" disease being entirely unknown to English veterinarians, the first part of this paper will be devoted to extracts from Dr. Billings' investigations.

Dr. Billings says in article II. on Original Investigations of Cattle Diseases in Nebraska—"that the name '*corn-stalk*' disease" though not correctly expressing all the facts, has been selected for this pathologically new and scientifically unknown disease in cattle, because practical experience has shown that its eruption is generally connected with the turning of cattle into stalk fields in the later fall and early winter months, as a sort of lazy man's method of gleaning up the remnants, as will be conclusively shown; and in conformity with the actual facts, it is not the corn stalks, but the leaves and tender top shoots which indirectly cause the peculiar disease in cattle (and other herbivorous animals) of which we are about to treat. Anyone who carefully observes the cattle when turned into such fields, will see that they seldom meddle with the hard, dry, bulky stalks, but, as they pass along, that they will pull off the leaves and tender top portions of the stalks. The same complaint has also been attributed to smut in corn: but a little reflection, combined with observation, would show that this idea is entirely groundless, as has been demonstrated by experimentation. Another equally

absurd idea is that lack of water or salt is the cause of this malady.

Professor John Gamgee was the first to allude to this disease, and he first attributed it to ill-effects of smut in the corn, and says again, further on, "the disease evidently is dry murrain, and to test his smut theory, Professor Gamgee fed two cows on 42lbs. of smut in three weeks, or 21lbs. to each cow with no evil effects whatever." Dr. Billings says: "Does any sane person imagine any cow or steer, turned into a stalk-field, would possibly consume 21lbs. of smut in three weeks' time?" Dr. Billings disposes of Gamgee's theory in regard to "frost-bitten grass" as follows: "Were that a cause, then every year more than half the cattle in our Western States would have to die."

Dr. Osborne, State Veterinary Surgeon of Nebraska, likewise investigated this disease, and diagnosed it also as dry murrain, from the condition he found the third compartment of the stomach in. To give his technique, it was as follows: "There is no contagious disease of cattle which affects the third stomach of the cow," said the Doctor, "and that was the seat of the trouble in every case that I examined. The third stomach, or manifold, was packed with dry food, which, when taken in the fingers, crumbled like flour and was so light it would blow away like chaff in the wind. The whole cause of the trouble is in the condition of the food the cattle eat. The hay and corn stalks are excessively dry, owing to the very dry fall and winter; and the cattle, not having sufficient quantities of salt and water, congests are found." Doctor Billings goes on to say, "The dryness of the third stomach, mentioned by Doctor Osborne, was not due to an insufficient supply of water, far less a lack of salt, but to an extremely high and prolonged rise of temperature in the animals, in connection with an acute blood infection, septicæmic disease, which condition would have been at once revealed by the use of a thermometer upon some of the diseased (living) animals." We will now pass on to the part dealing with Doctor Billings' personal experiences with this disease. The Doctor says: "The first case I had any connection with was of a most unique and unexplainable character, and remained a complete mystery to me until my investigations were completed in the Deluney outbreak at Fremont this year. It still remains mysterious in many ways, but it was from this case that I first obtained the etiological organism, and it is only from comparison of my notes of its method of development, in and on different media, that I am able to recognise it

as the same disease which occurred at Fremont a little over a year subsequently."

On January 6th, 1888, Dr. W. A. Thomas, a Veterinary Surgeon in the employ of the then Live-stock Commission, as Inspector, came into the Laboratory with two bottles, one containing the blood, and the other some pieces of the organs of a steer which had died very suddenly at the feeding station of the Standard Cattle Company, at Ames, where he had been sent to inspect a number of horses on account of glanders.

Dr. Thomas hastily opened the animal, and brought the material mentioned, only reporting the blood to have been fluid and of a *dark colour*, the liver swollen, anæmic, and of a dirty yellowish-grey brown colour; the spleen much swollen, and weighing 5 lbs., and the kidneys swollen, while their cortical substance was grey-red and *anæmic*, and the medullary was bright-red.

The Doctor at once made a microscopic examination of the blood by covering-glass specimens, and saw, in an apparently pure condition, innumerable micro-organisms having the polar, staining, and belted appearance, as well as the size and form of those he had already discovered in Southern Cattle Plague. These phenomena of resemblance were more strengthened by the fact that, like the organism of Southern Fever, this germ coloured much more sharply in a fuchsin solution than in either a blue or a violet. The Doctor differentiated this organism, further, from that of Southern Fever by the fact, that while pure cultures of the germ were rapidly fatal to rabbits, he found those rodents thus far immune to the action of the Southern Fever germ.

The wherefore of the death of this steer in so singular a manner, and among over a thousand others, all of which were presumably fed in the same way, and with the same materials, was then a great mystery; and although we now know it must have occurred, we still cannot understand why the outbreak was limited to a single animal, unless it happened to eat all the infested stalks and leaves on the place. Passing on, the Doctor says, "here, then, was a new disease discovered, and one belonging to the group of extra-organismal (etiologically) septicæmiæ, and caused by still another member of the ovoid-belted class of bacilli, or germs; but where the organism came from, or how the disease originated, was still a perfect mystery, which was not much cleared up by the appearance of a second outbreak in an entirely different part of the State, from which I also received material

and the following communications." This material came to the Doctor in a still more unsatisfactory state than that previously mentioned. "Microscopical examination of the first organs revealed the presence of, apparently, the same organism as had been found in the *Ames* case, and the inoculation of small animals enabled me to obtain pure cultures, by which its identity with that germ was sufficiently demonstrated."

The next outbreak mentioned by the Doctor was at Fremont, Nebraska, February, 1889, and not being able to visit the locality himself, he dispatched Dr. Thomas with instructions. He reported the autopsy as follows :—

AUTOPSY.—Pleuro-pneumonia sufficient to kill, the entire lungs being congested, and the lower portions of the lobes solid; inflammation of the pleura, and about two gallons of serum in the thoracic cavity; stomachs all in good condition; liver very firm, and pale coloured; gall bladder well filled, urinary bladder filled; intestines inflamed.

The material brought in by Dr. Thomas consisted of fresh blood from the heart, which was coagulated, the coagulum being solid and of a dark purple-red colour; serum over it straw coloured and clear. There were pieces in a tin box that were somewhat frozen, which was according to Dr. Billings' instructions. The following is the result of Dr. Billings' examination of the pieces of these organs :—

Lung.—The pleura covering the piece of lung was much thickened, presenting an irregular, shreddy surface of a yellowish - red colour, interrupted by numerous small red centres. The vessels of the interlobular space were engorged, much resembling the conditions seen in acute pneumonia in swine-plague. The lobuli were solidified, some being of a greyish-red colour, others purplish-red, while still others were of a yellowish grey-red colour and very anæmic. The cut surface was excessively œdematous, and the interlobular tissue was swollen. Many lobuli presented centres of a diffuse dark purple-red colour, between which were others of a pearly-grey colour, others were dull grey, and still others yellowish-grey, with a varying amount of reddish tissue between them. Bronchial tubes filled with a straw-coloured coagulated material. As mentioned previously, such a description would answer equally well for a form of pneumonia met with in swine-plague, especially in 8 or 10-day cases. In fact, the structure of the lungs has such a close resemblance in cattle and swine, that there is no pathologist living who could have

told this piece of lung from that taken of a similar case of swine-plague.

Liver.—Capsule normal; cut surface very opaque, excessively swollen and anæmic, and of a dull greyish, brown-red colour; peripheral portions of the *acini* of yellowish-grey colour; centre reddish.

Kidneys.—Cortex much swollen, anæmic, opaque, yellowish grey-red in colour; vasa and tubuli recti much distended; medullary substance bright red, interrupted by a very pregnant distension of the tubes, and an occasional large blood vessel. A small piece of the small intestine presented a very much swollen mucosa, covered with a thick viscid coating, and of a diffuse yellowish-red colour. Covering glass specimens from all these organs, gave apparently pure representations of one and the same organism.

Histological Examination of Organs from the Fremont Cow.

Lungs.—Under low power, a section from the lung presents numerous centres of consolidation, the outlines of which are more or less sharply defined from the surrounding tissue, these centres having irregular shapes and extent; the cellular products filling the alveoli, being much more compact and dense in some than in others; but what is most striking, is that the most intensely infiltrated alveoli are generally those most distantly situated from the bronchioles, from which the irritation to the parenchymatous tissue extended. The balance of such a section presents alveoli, the majority of which are filled with a slightly granulous, very delicate, slightly yellowish-grey material, in which are to be seen numerous nuclei, the same being much more numerously represented in some spots than in others. The larger vessels are compactly filled with a similar material. The outlines of each alveolus are distinctly seen, and marked by nuclei-looking bodies along their course. The mucosa of the bronchioles in those sections is swollen, and covered with a considerable amount of a yellowish-grey material. In many alveoli the yellowish-grey material spoken of is more or less mixed up with nucleated material. Upon closer examination with a higher power, the aforesaid yellowish-grey material in the alveoli is in many cases seen to be of an almost homogeneous character, a few delicate thread-like lines only running through it here and there. An occasional nucleated body is also to be seen. In others, on the contrary the mass is seen to be composed of

small round cells (red blood cells), their contour lines more or less distinctly marked, each cell being very clearly straw-coloured, transparent and refracting. Among these cells are to be seen numerous thread-like fibres extending in different directions, as well as quite a number of round cells, mono- and multi-nucleated, the former of which are in general much larger than the latter. The vessels taking their course along the septa of the alveoli are distended, and marked by the presence of numerous round cells with distinct nuclei, in close apposition with the walls, many of which are collected along the outside of the vessel in more or less extensive masses. The contents of the consolidated alveoli is made up of the usual formed round cells. The interstitial spaces appear to be completely filled up with round cell infiltration.

Liver.—Offers nothing essentially striking, other than the changes upon the cells common to acute parenchymatous hepatitis. The cells are very much enlarged, many of them being but a diffuse granulous mass, presenting nothing of a nucleated character. In others the nucleus is quite pale, the nucleolus not being at all visible, while in others, again, both are distinctly marked.

Both around the larger and smaller blood vessels decided leucocytic migrations are seen to have taken place. In several places are circumscribed accumulations of round cells more or less toward the centre of an acinus, and lying in proximity with, and in apposition with one side of a central vein, while others are more or less in the body of the acinus; but a very close examination will show that they surround or extend from a capillary.

Kidney.—A section of the kidney shows all the changes of acute parenchymatous nephritis. The urinary tubules are swollen, the contents of most of them being nothing but a granulous detritus; cellular structure absent. In other tubes, sometimes one swollen cell with defined outlines and prominent nucleus may be seen attached to the membrana propria, while in others several such cells may be present, but seldom in continuity. But a very few tubes, and these for but very short distances, present normal characteristics. Here and there, more or less circumscribed, but dense, round-cell infiltration may be seen to have taken place at the expense of the parenchymatous tissue, which self-evidently antedated the acute changes in the other. Along the line of capillaries a limited round-celled migration has occurred, especially in points where the vessels are distended—owing to compression of the

lumen in the immediate vicinity—by the intensely swollen parenchyma, which led to local interference with the circulation.

EXAMINATION OF THE ORGANS FOR MICRO-ORGANISMS.

The organisms described in these pages as the etiological factors in the corn-stalk disease, are scattered profusely through sections of the liver, being mostly situated intra-cellular, that is, between the cells of the parenchyma, and plentifully represented in the blood vessels, as well as having been taken possession of in quite large numbers by an occasional round cell. In one place they can be seen to have formed threads, as is the case with their near relative, the germ of swine-plague, more especially in the kidney; occasionally two or three individuals can be seen linked together. They are also very profusely represented in the lymph-glands under the same conditions, but not so much so in the lungs.

The germ grows well, and more characteristically, at ordinary room temperature, than in the thermostat.

Potatoes.—Upon the cut surfaces of sterilized and steamed potatoes, the germ of the corn-stalk disease grows as greyish white, somewhat elevated colonies; while that of Swine-plague develops in a sort of yellowish, dirty ochre colour, sometimes resembling muddy coffee, and that of the Southern Cattle Plague in primary straw-yellow colour, which eventually assumed a slightly reddish shade. Very soft moist potatoes will affect the growth and colour.

White of Eggs.—The most practical way of sterilizing this material, and of getting it in a convenient form, is to steam the eggs until cooked hard, and then remove the requisite portion of the shell with sterilized forceps, after which they are placed in the moist chamber, prepared in the same manner as for potatoes or plate cultures. Upon this medium the corn-stalk germ grows as clear yellow colonies, with slightly raised edges, and is to be easily distinguished from that of Swine-plague, which develops as a somewhat oval projecting semi-fluid mass, the centre being the much more prominent, and from that of the Southern Cattle Plague, which presents a buff-coloured colony.

Agar-Agar (Plain, not Glycinic).—Upon this medium, when the surface is dry, and not accidentally moistened by the fluid in the bottom of the tube, the corn-stalk germ develops in a really characteristic manner in contradistinction to the other two. In the colour of the development, there is

nothing essentially different to be seen; but in comparison with the Swine Plague organism, the edges of the cultures are more distinctly scolloped, the separating lines extending deeper into the body of the cultures. But a marked point of difference is, that commencing from the line of inoculation, the corn-stalk germ forms lines, or rays, which are finally limited by a diffuse semi-transparent border; each of these lines is made of individual colonies. Again, the cultures are much more dry and less viscid than those of Swine Plague, and adhere much more closely to the underlying agar; in fact, when old, it will break off in fragments on attempts at removal with the wire. As said, in order to get these effects, the agar must be just right, and have a dry surface. On agar, there are no essential points of difference between the Swine Plague and Southern Cattle Plague organisms, except rapidity of development, and a slight variance in the irregularity of the edges of the cultures.

In and on Beef Infusion Gelatine (Punctures).—The growth, in the gelatine itself, of these organisms, offers nothing of a differential characteristic nature; but their development upon the surface varies considerably, the germ of the corn stalk disease developing and spreading over the surface the most rapidly, and with more leaf-like extensions. It is also more dry and lustreless than either of the others. That of the Southern Cattle Plague is next in rapidity of development, while that of Swine Plague spreads more slowly, but in a thicker mass, and with more prominent edges. Both this and that of the Southern Cattle Plague form a moist, and more or less viscid colony, while the corn-stalk germ adheres to the gelatine, and is inclined to break up on removal with the wire, especially if the cultures are a little old.

The next step was to prove the malignancy of the cultures thus obtained.

Dr. Billings inoculated the following animals, February 11th, 1889.

1. One full-grown buck rabbit, with a pure bouillon culture. In subcutis of ear, two drops, and inside of right flank three divisions of a one C.C.M. syringe. The ear was inoculated to see if any tumefaction would ensue.

2. One full-grown male guinea-pig; three divisions of syringe on inside of right flank.

3. Mouse. One drop in same locality. The mouse died at 3 p.m., on the 12th. "No œdema at point of inoculation, but local vessels were engorged, and serosa of abdominal cavity swollen and glistening; muscles looked as if cooked;

spleen, liver and kidneys swollen, and very full of blood; lungs congested." The rabbit died on the 12th, at 3.25 p.m. The autopsy as follows: "Skin and subcutaneous tissues at *locus inoculationis* much engorged, but no œdema present; of a diffuse red colour, with marked injection of larger vessels. No effects in ear other than mentioned; an effusion in cavities of the body; blood extremely thin and of a purple-red colour; lymph glands much swollen and very juicy. *Liver* swollen, serosa normal, but the parenchyma reflecting through it was of a yellowish-grey-red colour; peripheries of acini yellowish, centre red, cut surface very friable, opague, anæmic, yellowish-grey in colour. *Kidneys* swollen, capsule non-adherent, cortex anæmic, opaque, grey-red in colour, medullary substance of a diffuse dark-red colour. *Spleen* swollen, and pulp very juicy and soft; vessels of mesentery engorged; those on curvatures of stomach the same; mucosa of stomach swollen, covered with thick, viscid coating, diffuse, bright-red in colour. Contents of small intestines fluid; mucosa much swollen, yellowish-red in colour, and covered with a viscid coating; contents of large intestines pultaceous; mucosa not swollen. Lungs engorged; pure cultures of same germ as found in material from Fremont animal derived from each organ, and accurately tested by comparison with original cultures, as well as microscopically; same organisms in small intestines, and isolated from others present by plate cultures.

At 2 p.m., on the 13th, the guinea-pig dead. Lesions same as in rabbit; cultures comparable.

These experiments demonstrated three facts of essential differential diagnostic value. Aside from those demonstrated by the cultivation experiments, these inoculations showed that the organism in question could not be that of Swine Plague on account of its acute fatality. It could not be that of Southern Cattle Plague, because of the immunity of rabbits to that germ in such small doses. It could not be the germ of the German "Wild Seuche," because of the total absence of enormous œdema which invariably follows such inoculations in that disease. It must then be a new disease.

Dr. Billings also inoculated a steer and a hog with the same material. The inoculation gave negative results as far as the hog was concerned, and the steer, although sick for several days, eventually recovered, although it became excessively emaciated. It was inoculated on the 10th of February, and on the 16th, the Doctor washed the inferior surface of its tail with Cor. Sub. 1—1,000, and opened the local vein with a sterilized knife, allowing the blood to flow

directly into a sterilized homœopathic phial, from which blood pure cultures were obtained, which were proven by cultivation and comparisons with the various other cultivations previously mentioned, all of which were kept upon the different media, until the investigations were terminated to his satisfaction.

(To be continued.)

ANTISEPTIC DRESSING OF WOUNDS IN THE LOWER ANIMALS.

BY R. W. BURKE, F.R.C.V.S., CORRESPONDING MEMBER OF THE ITALIAN VETERINARY ACADEMY, ARMY VETERINARY DEPARTMENT, AMBALA, INDIA.

A GOOD deal of apathy exists in regard to this important subject, both among veterinary surgeons and medical practitioners; some maintaining that it is useless, while others are of opinion that it is altogether impracticable in the case of the lower animals. These opinions are usually held by individuals who are unacquainted with the workings of the system called the "Antiseptic System." As in other questions so in this: it is absolutely necessary that one should be acquainted with the practical workings of a system before he attempts to pronounce judgment on its merits or demerits. It would appear that those who condemn as useless the antiseptic treatment of wounds in the lower animals, do so from a mistaken belief that to dress a wound antiseptically it is necessary to employ the carbolic spray. Nothing could be more erroneous. It may be as well to say that dressing wounds under the spray, or "Listerism," is only resorted to, by the practitioner of human surgery, in the case of a deep wound having excessive discharge. There are numerous other wounds, however, which are not very deep and attended with less discharge; and they may be better treated by a little more observance of the principles of antiseptic dressing as distinguished from "Listerism" *per se.*

The following questions naturally suggest themselves:—What are the objects of antiseptic dressings? And what are the means at our disposal for attaining those objects? First, the objects of antiseptic dressing are primarily and chiefly these: (*a*) to prevent the death of tissue; (*b*) to favour the removal of dead tissue, and (*c*) to assist nature in attending to her wants in each case. All this may be effected in many different ways: we assist nature by giving *rest* to an injured part, by preventing *tension* in the wound, and in various other

ways. Discharges, when excessive, are likely to accumulate and cause *tension* in a wound. A part that is in motion after being wounded is said to be in a state of *unrest*. Tension by pressure causes a breaking down of the healthy tissues, their disintegration and suppuration, or even mortification. A state of unrest prevents organisation in a newly-formed blood-clot, or even assists degeneration and evacuation of it from the wound. The death of tissue is prevented by affording it rest, by relieving tension in it, and by removing dead tissue from it, because, as Sir James Paget has shown, "all newly-forming tissue has a tendency to become *like* the tissue near which or on which it lies." The means by which these desiderata may be attained are obvious and many. We give *rest* in a case of sprain of the back tendons by supporting the latter with firm bandaging, by raising the heel, or by creating surrounding swelling artificially by blister, as taught by John Hunter, etc.; in that of inflamed joint by transfixing the joint and preventing all motion in it; in that of inflamed eye by putting a shade over the eye and protecting it from the light; in the case of inflamed kidneys by the administration of diaphoretics; in inflamed bowel by stopping its peristalsis by the administration of sedatives; in injury to the brain by the administration of cathartics; in disease of the heart by cardiac sedatives; and so on. The means at our disposal, therefore, belong to the surgeon as well as to the physician.

Again, we relieve *tension* in a case of "bruised sole" by cutting away the bulging horn and allowing a free exit of the accumulated fluid found pent up between the horny sole and the solar aspect of the *os pedis*; in abscess by early lancing it; in hydrothoras by tapping; in deep-seated inflammation by the use of counter-irritants; and in deep punctured or incised wounds, which are attended with much discharge, by drainage. There are various kinds of drainage which are employed, *viz.*, gutta-percha tube drainage; sponge drainage, and the capillary drainage. The first is employed when copious discharge is expected to result; the second, when drainage has to be effected over a large area, and where considerable discharge obtains; while capillary drainage is used chiefly in the case of punctured and deep wounds, where it is intended to convey the discharge upward to the surface of the wound. The materials employed in capillary drainage are catgut and horse-hair. Several plaits of these are cut and secured in position in a wound where drainage is required. Some prefer the catgut, others the horse-hair. They both act on the principle of suction, which is carried on through the

spaces present between the two strands of the catgut or horse-hair used. The sponge acts on a similar principle, and there is no better sucking agent that can be employed. The catgut, horse-hair or sponge is only used in the case of extensive wounds; it does not spoil after usage, and may be utilized for several cases, if properly cleaned and disinfected every time it is used. The gutta-percha tubes are of various diameters, being perforated throughout their whole extent longitudinally, and here and there laterally. They are only necessary where active disintegration of tissue and copious discharge are present.

We thus assist nature in many and varied ways in guarding against the danger of putrefaction and death of tissue, and so claim to treat wounds, in the phraseology of the present day, antiseptically. We try to prevent the germs of putrefaction from getting a suitable pabulum wherein to lodge and spread their destructive influence. And, as it has been shown, this desirable end is attained in ways apart from Listerism properly so-called. Listerism, or the treatment under the carbolic spray, is necessary only in certain cases. What are those cases where it is indicated, and those where it is not required? It is necessary (1) in injuries to flat bones; (2) in injuries to serous membranes accidentally exposed to the external air, as in 'opened joint,' in wounds of the chest, as in broken ribs; (3) in injuries to fibrous membranes, as the periosteum, sheaths of tendons, and fasciæ of muscles; (4) in deep punctured and incised wounds; (5) where profuse discharge is present and (6) septicæmia is threatened, and (7) when there is considerable loss of tissue and a large blood-clot has to be organised. It is not indicated where all these conditions are absent, and when the wound is superficial and its base callous.

One desideratum in the antiseptic system of treatment of wounds is to prevent death of tissue. Lister does this by preventing the access into a wound of germs which are engaged in causing the destruction of all nearly injured structures. This method of prevention of death of tissue is known under the name of "Listerism." Listerism is the most perfected part of the Antiseptic System, though it is not the whole of it. It consists of a "deep" and a "top" dressing, which are employed always under the carbolic spray. The deep dressing may not be necessary in all cases, such as small wounds and when there is little discharge present. Folds of gauze and sponges are used as absorbents in the "top" dressing when much discharge is expected;

while catgut, horse-hair, or gutta-percha tubes are used in the "deep" dressing, as a drainage and with a similar object. Immediately over the wound is placed the "green-protective," which is a kind of oil-cloth intended to afford protection to the injured surface of the wound against the materials employed in the dressing. It also acts as a kind of diffuser of the discharges that result from the wound, and thus obviates *tension* in it by preventing the accumulation of fluids. Over this protective is used the boracic lint, previously dipped in carbolic solution. Over the "top" dressing, and where much discharge is suspected, is placed the Mackintosh cloth, which is also a kind of oil-cloth, and intended to promote diffusion of the discharges brought to the surface by the different modes of drainage employed. Over all the bandage is applied, which is secured in position by the use of safety pins. All materials used in the dressing, as well as the various appliances, the surgical instruments and the surgeon's hands, should be previously dipped in a solution of carbolic acid (1 to 40). No part of the dressing should be attempted except under the carbolic spray.

Carbolic spray.—There is a special apparatus brought into requisition in the use of the carbolic spray. By applying heat to a chamber in the apparatus containing a 1 to 40 solution of carbolic acid, the latter is given off in the form of a vapour, which rises and gains exit through a minute orifice in a tubular projection attached to the top of the apparatus, which is termed the "antiseptic spray-producer." Various patterns of the "antiseptic spray-producer" are now in use,—improvements in construction being constantly suggested by different surgeons.

Listerism has scored an appreciable triumph over all older methods of treatment in operation.—(1) French surgeons try the cold water treatment of wounds: this amounts, in fact, to removal of dead tissue from a wound, alluded to on a former page. (2) Some surgeons try the treatment under a scab, by painting a wound with collodion, &c., and making an artificial scab; but, in our opinion, this is not good practice, inasmuch as the effusion under the scab is liable to collect and cause tension, which will favour degeneration and slough of the newly-formed blood-clot in the wound. (3) Native practitioners try *neem* fomentation of wounds: this favours natural drainage, as well as surrounds the wound with a germicide vapour; but when a large clot of blood is undergoing organisation it is liable to favour its degeneration and ejection. (4) The treatment of opened-joint by blister, with

the view of closing up the orifice and preventing access of air into the joint, is also an antiseptic method of treatment. For old standing wounds and ulcers having a putrescent discharge, a callous base, and being slow to heal, chloride of zinc, iodoform, and lead ointment are employed: they promote the healing process by acting both as antiseptics and astringents.

What are the benefits resulting from a due observance of all the principles of Antiseptic treatment? They are these: (1) No putrefactive irritation; (2) no death of tissue; (3) no pain resulting from inflammatory tension; (4) no putrefactive poisoning, or septicæmia, due to absorption of putrid material from the wound; (5) no spreading gangrene; (6) diminished period during which the animal must be kept from work. The principles of antiseptic dressing displace evil by crowding it out from the good, which is done in accordance with the law of Paget—"all tissue has a tendency to become like the tissue near which or upon which it lies."

That these benefits are real, and not imaginary, is attested by the results in practice. It has been stated by some, in regard to septicæmia as a result of putrefaction in the local sore, that the lower animals are not subject to attacks of this disease. Nothing could be more erroneous. It is not matter of opinion, but something which the experienced surgeon can easily determine for himself in doubtful cases. It is well known that following the infliction of some wounds, whether in man or in the lower animals, fever sets in. It is contended by some veterinary surgeons that the fever attending such wounds is only the result of pain, or what is called traumatic or "irritative fever." In some cases this may be true; in others it is not. Fever resulting from pain, as well as fever which is induced by absorption of aseptic tissue detritus, is characterised by totally different symptoms, by totally different results from those peculiar to the septic disease. It will be sufficient to state here, that the clinical thermometer should always be employed in all cases of doubt and where the diagnosis is uncertain.

What are the disadvantages of the Antiseptic system? The aim of the system being to guard against putrefaction, substances are employed called antiseptics, which have the power of preventing sepsis. All workable antiseptics, so far as we yet know, are *irritants*; so that, in all probability, they act by destroying organisms which are the cause of putrefaction. Thus, when carbolic acid, boracic acid and salicylic acid are applied to the tissues, they cause irritation.

What shall we say of carbolic liniment, of the strength of one to sixteen and one to eight, recommended by the older practitioners? This method of treatment is quite right, but only in superficial wounds; whereas in deep-seated wounds, where the slightest excitement on the part of the animal at the time of dressing will give rise to absorption of air loaded with septic germs, through the expansion of the cellular structures composing the walls of the wound, it will be of little use. In newly injured tissues and in healing ulcers the carbolic liniment will certainly prove injurious, as it is an irritant and causes a breaking-down of the blood-clot and destruction of the granulation tissue.

How often should the dressings be changed in Listerism? This will depend upon the indications presented by individual cases. When the discharge has soaked through the top dressing, or when the Mackintosh is stained by putrefactive changes, the dressing should be renewed. This may not be necessary for a whole week in many cases. It is only necessary to undo the bandage and examine the Mackintosh, to see whether the dressing requires renewal or not. If the Mackintosh is clean and dry and there is no evidence of the discharge having reached the surface, the dressing must not further disturbed, and the bandage again applied and secured in place with safety pins. It does not matter whether this is done under the carbolic spray or not. But the "deep" dressing must never be disturbed except under the spray.

When and in what class of cases is Listerism admissible? It is admissible in all cases where the time of receipt of injury does not average more than 12 to 24 hours, and where putrefactive change has not already set in. It is also admissible where a putrid sore is convertible into a non-putrid one. Thus, in comparatively superficial wounds, and where there is no communication of the air with serous cavities, as exist in opened-joint, in injuries to the thorax, etc., a septic wound may be made into an aseptic one by judicious cleansing of the wound and removal of the septic products from it by thorough washing. If, however, the septic changes are pronounced, and the subjacent tissues are infiltrated with the products of septic decomposition, this latter mode of dressing will be impracticable. No wound is convertible from a septic into an aseptic state, except where the products of decomposition are slight in amount and are removable, and where the deeper tissues are not infiltrated to any extent or otherwise implicated in the septic process. Experience will indicate the convertible cases. The efficacy of carbolic acid in the treatment of chronic ulcers

is much inferior to many other applications. Several such are in use, but especially the boracic acid ointment made after Lister's formula, of one part white wax, one part boracic acid, two parts paraffin, and two parts almond oil, modified and softened by a little glycerine. Mr Hutchinson's "antiphlogistic lotion," made of acetate of lead two parts, acetic acid one part, rectified spirit 16 parts, is also very useful in slowly healing, irritable ulcers. The acetate of lead and sulphate of zinc lotion recommended by Professor Dick, of the Edinburgh Veterinary School, is also useful in similar cases. Some American surgeons speak highly of the carbonate of lead paste, and we have found it beneficial in chronic ulcers with slight discharge; while chloral lotion and iodoform powder will be especially useful in cleansing dirty ulcers. Lotio ferri will be found highly advantageous in pale anæmic ulcers with watery discharge. We must shun the over-use of wet applications to chronic ulcers, and the surrounding skin should be kept as dry as possible. In a healthy sore, where cicatrisation is required, the lotion most rapid in producing the desired effect is chloride of zinc. The cautery has been found useful in phagedenic ulcers. Myrrh, alum and sulphate of iron powder answer well in indolent ulcers; tincture of myrrh and aloes in similar cases.

We prefer to think that Veterinarians have modified their views with regard to the difficulties said to be inseparable from an easy application of the antiseptic system to the treatment of wounds in the lower animals; further, that the above regime will not be treated with the former indifference. Almost everyone is ready to confess himself an expert in the healing art, but to numerate individual principles is a position few are willing to take. It is but too common to take refuge behind redundancy of knowledge; but to analyse that redundant knowledge and see where its benefits lie, presumes a success which experience alone begets.

My main object in appealing to the above principles, is to refute the many strange opinions that are prevalent in regard to the application of the antiseptic system of treatment in the lower animals. The ordinary and plausible answer to the statement that this system of treatment is not applicable in the case of the lower animals, is that, however theoretically sound it may be, it is in practice remedied. For, as will have been seen from the foregoing description, the antiseptic system does not include Listerism only. It is said that we are crude to the extreme in our mode of dressing wounds in the lower animals. Perhaps I may convince some of my readers

that, if we are crude, we are not without the wish to improve upon our past crudeness.

To summarise: what are the chief points to be borne in mind in the treatment of wounds? They are: (*a*) to stop the bleeding on the receipt of injury; (*b*) to remove foreign bodies which act as irritants; (*c*) to assist drainage; (*d*) to avoid putrefaction; and (*e*) to advise special modes of treatment in special cases.

(*a*) The first is done by applying ice to the bleeding part; by the use of styptics, plugs, ligatures, etc.

(*b*) *Drainage.*—Without effecting drainage, healing by primary union cannot be properly established. If the wound be stitched up from end to end, the effusion collects, giving rise to *tension*, which causes irritation, inflammation and suppuration. The drainage tube has certain disadvantages unless antiseptic precautions are used. Putrefactive organisms may pass up the cavity of the tube and give rise to putrefaction. Secondly, in consequence of its elasticity, the india-rubber tube is apt to be compressed. And lastly, all varieties of drainage (india-rubber) tubing contain more or less sulphur: hence sulphate of lead is formed and the green protective is stained, and it is difficult to tell whether this staining is due to putrefaction or to the drainage tube.

Sponge is employed when much effusion or hæmorrhage is expected, to act as capillaries. Gauze and catgut are also used with a similar object. Mr. Chiene, of Edinburgh, introduced the use of horse-hair drainage. Horse-hair acts like catgut, by capillarity. A sponge, when dry, consists of a mass of capillary tubes. Thus, a dry sponge placed externally on a wound helps, by capillary attraction, the flow of the discharges, and prevents tension, irritation, suppuration, and destruction of the newly-formed blood-clot in it.

(*c*) *Foreign bodies.*—These act as irritants in a wound. Hence the necessity of thorough cleansing of the wound prior to all dressing. This will be necessary in all cases. For even when a wound is carefully dressed according to antiseptic methods, and the discharge is non-putrid, yet it may be *dead* and constitute "waste-matter," which, if not washed out, will be likely to be absorbed by the lymphatics of the part and introduced into the general circulation, occasioning a rise in temperature or fever. The causes of rise in temperature, as considered by the surgeon, are three, *viz.*, (*a*) pain; (*b*) absorption of refuse-matter; (*c*) absorption of putrid matter.

(*d*) *To avoid putrefaction.*—The most perfect means of doing this is the science of "Listerism," or the practice of dressing wounds according to Lister's method, which has been described on a preceding page.

(*e*) *Special treatment.*—If union by granulation be desired the wound is generally stuffed, so as to prevent the edges from growing together by primary union, If union by scabbing be desired, the best agent for the formation of an aseptic scab is aseptic lint ; this method is practicable only in the case of small wounds and where debility is not a prominent symptom. Should any tension under the scab occur, the part must be immediately relieved by puncturing the scab. As a rule, the treatment under a scab answers best in canine surgery. In dogs a great deal of absorption goes on in wounds, which is less perceptibly present in other patients. Hence, wounds in dogs are attended with less danger of tension, which is not the case in all animals. Dogs, moreover, lick their own sores, and a natural scab is formed which protects the wound.

In large, incised wounds, stitches will be necessary. In contused wounds, stitches are not indicated, as the vitality of the wound is lowered and stitches tend to increase this condition.

In the treatment of punctured wounds the great thing to be borne in mind is efficient drainage; the depth bearing no relation to the size of the external opening, the drain must lead from the bottom of the wound to the external opening.

EXTRAORDINARY LUSUS NATURÆ.

T. H. MERRICK, F.R.C.V.S., NORTHAMPTON.

ON January 19th last, my attention was drawn to a three-year-old barren, short-horn heifer, late the property of Mr. W. Jones, of Dallington Grange, Northampton, and about to be killed by a local butcher, by whom it had been bought in the ordinary fat-stock market. I may at once say that the animal was supposed to be a hermaphrodite.

I examined the creature carefully while alive, and could detect nothing abnormal, except that the vulva was exceptionally small, not being much more than an inch in length ; and on attempting to pass my finger into the vagina, I could only insert it about three parts of an inch. There was a very slight development of the mammary gland, but no appearance of anything resembling prepuce, penis, or rudimentary testes.

I arranged with the butcher to be present when the animal was slaughtered, and made a careful post-mortem inspection. The skin was removed, and this disclosed the fact that no vaginal cavity was present; all that was to be seen was a white fibrous-looking tube, opening into the small vulva above-mentioned. This, I at once concluded, was the urethra, and carefully followed it through a layer of muscular and adipose tissues till it joined the bladder—which appeared healthy, but quite empty. Further examination disclosed total absence of generative organs appertaining to either sex—vagina, uterus, ovaries, rudimentary penis, or testes, were alike absent; the whole of the remaining internal organs were perfectly normal, and loaded with adipose tissue. The animal had never suffered from ill-health, had been stall-fed, and the only thing noticeable was that, instead of micturating in the ordinary way, urine was continually flowing from her at short intervals in small quantities. I saw the carcase after it had been dressed, and it had all the appearance of that of a bullock—indeed, the butcher remarked that the hind-quarters had more the appearance of those of a bull than of either a heifer or bullock.

I feel sure that no apology is necessary on my part for occupying your space with a record of this, to me, extraordinary freak of nature, and I should be glad to hear if any of my brother practitioners have ever heard of, or met with, any cases in bovine, or other animals, of a like nature.

Editorial.

THE SUPPRESSION OF TUBERCULOSIS IN ANIMALS INTENDED FOR THE SUSTENANCE OF MAN.

SINCE long before the commencement of this Journal, we have insisted upon the risk mankind is exposed to in the presence of Tuberculosis among the animals which are utilised as food; and during the seventeen years of its existence, we and other members of the veterinary profession have in its pages strenuously insisted on proper sanitary measures being adopted to deal with this most serious of all animal scourges. But up to the present time nothing has been done; in fact, the pest is not even officially recognised as one that is due to contagion, and therefore worthy of notice. Very many long years ago it was a matter of knowledge to every observant and intelligent veterinary practitioner that this is a contagious and infectious disease, and long before there was any suspicion that the flesh and milk of affected bovines were a source of danger to those who consumed them, it was recognised that Tuberculosis was a destructive disorder among cattle. With Villemin's experimental evidence as to its transmissibility to animals of different species, greater attention was devoted to it by veterinarians, many of whose experiments corroborated to the fullest extent the results of that investigator's researches, and showed the necessity for checking the spread of the disorder and safeguarding the public health from a risk which was rendered only too manifest to be put aside as of no moment. Koch's discovery of the specific agent in the production of Tuberculosis, while it has certainly added something to the sum total of our knowledge of the disease, has done nothing towards our knowledge of its prophylaxis, which was as well understood before as after that event.

Considering bovine Tuberculosis from a veterinary point of view, and without reference to the possible and probable danger with which it threatens mankind, it must be confessed that it is the most serious, because the most wide-spread, contagious disease we have among the domesticated animals in this country; and as there is no attempt at limiting its extension or diminishing its ravages, it must have a most damaging influence in diminishing our national wealth, so far as animals are concerned. We have no information as to the

extent to which it prevails, but from casual hints and observations we are forced to the conclusion that it has obtained a very powerful hold of our cattle—a hold compared with which contagious pleuro-pneumonia is as nothing. The tale told in our slaughter-houses is a startling one in this respect; and apart from the disgust and dread excited by knowing that the tuberculous carcases dressed there are to be consumed as food by the public, we are led to form a kind of notion as to prevalence of the disorder. Surely if for no other reason than that of protecting our bovine stock from destruction, sanitary measures should be adopted and carried into resolute operation. To be conducting experiments at this time of day, ostensibly to ascertain how far the public health is endangered by the consumption of the milk or flesh, is simply trifling with what is and has been for generations a great and a glaring evil that should have been dealt with long ago. We already have enough and to spare of the only kind of experimental evidence that can be obtained in that direction, while the proof that it is a most destructive communicable disease among cattle, needs no more demonstration than did contagious pleuro-pneumonia before it was grappled with, after many years' agitation on the part of agriculturists and sanitarians for its suppression. Experimentation now means nothing more than staving off action, and it is possible that the unconscionable time that has already elapsed since the Government commenced its experimental inquiry, will be spun out till the crack of doom, unless pressure is applied to have some results published. What these will be we need not trouble ourselves to surmise, as they will not, in all probability, add anything of importance to what had been before us for some years, nor will they in the least degree affect the question which we, as veterinarians, thoroughly understand with regard to suppressing Tuberculosis. By stamping it out in cattle we are effecting two objects—protecting our herds, and removing a source of danger to mankind. Much has been said as to the difficulty of diagnosing Tuberculosis, but those who have had any experience among tuberculous cattle will, we fancy, agree with us that it is little, if any more difficult to detect than pleuro-pneumonia. At any rate advanced cases are not, and these are the ones which are a source of danger to man and beast. This is, primarily, a question of Veterinary Sanitary Police, and it is something of a disgrace and a scandal that nothing is done, or likely to be done, to limit the ravages of the most serious preventable malady that affects animals.

INFECTIOUSNESS OF TUBERCULOSIS.

THE following memorial has been sent to us for publication :—

"To the Honourable the Lord Provost, the Magistrates and Council of the City and Royal Burgh of Glasgow, as the Police Commissioners thereof.

"The Medico-Chirurgical Society of Glasgow, a body consisting of over 200 members, mostly practitioners in the West of Scotland, held a discussion, and arrived at the following resolution at a meeting on the 18th of December, 1891 :—

"'That a memorial be presented to the Town Council of Glasgow calling their attention to the fact that Tuberculosis is now fully recognised as an infectious disease, and asking them to take the matter into their serious consideration, with a view to the protection of the community from the infection.'

"A committee was afterwards appointed to frame such a memorial as would serve to indicate with somewhat more of detail the views and objects aimed at in the resolution. We beg, accordingly, to submit to your Lordship, and to the magistrates and the Town Council, the following considerations :—

"1. Tuberculosis is an infectious disease in the sense that in all cases of this disease the one constant and necessary element in the causation is a microbe. This microbe grows and multiplies in the bodies of certain animals and of man, when introduced from without, and in so doing it produces an intensively active poison which is the more direct agent in bringing about the morbid changes in the living structures. There are doubtless other elements in the causation, such as inherited and acquired susceptibility, but the microbe is the only essential and constant one, and there is evidence to show that, without any special susceptibility, it may produce the disease if introduced in sufficient quantity.

"2. As the microbe will not grow except at a temperature almost identical with that of the body, the living bodies of men and animals affected are the great propagating places of it. They are the sources of the supply, and constitute the centres from which the infection is derived. But the microbe is not retained in the bodies of the persons affected. Most of the forms of Tuberculosis are characterised by discharges of matter from the affected parts of the body, and these discharges contain the microbe—often in very large quantities. The most frequent form of Tuberculosis is consumption of the lungs, and persons affected with this disease almost constantly spit up matter which is loaded with the infective microbe. The spit of such persons when dry is liable to be pulverized into fine dust, and this in its dissemination carries the still living microbe with it.

"3. It is believed that Tuberculosis is fairly to be compared, as regards its infectious quality, if not with typhus and smallpox, at least with typhoid or enteric fever, although the mode and channel of the infection may be so different as to make it much less obviously dangerous to live in the same house or room with a case of consumption than it would be in the case of one of the well-known contagious fevers. Tuberculosis, however, is much more disastrous in its results than all the other infectious diseases put together. According to the annual report of the Registrar-General for 1888, the deaths registered as due to Tuberculosis in Glasgow numbered 1,824, and those assigned to all other miasmatic—that is, infectious—diseases, including measles, scarlet fever, whooping cough, &c., were 1,089. For reasons known to us, it seems certain that the mortality from tuberculosis considerably exceeds that which appears in the Registrar-General's returns, but even these figures are sufficiently striking. The deaths registered as tuberculous made up 15·5 per cent. of the total deaths in Glasgow in 1888. These facts imply a large amount of what may be called 'floating infection' in our midst.

"4. The Town Council by its action in prohibiting the sale of tuberculous meat and milk has, in our opinion, very properly endeavoured to grapple with one source of the infection. It may be said that the great prevalence of Tuberculosis in cattle, especially in milk-cows kept in town-byres, and therefore both more likely to be infected with Tuberculosis and to become, in turn, sources of infection through their milk, has justly been already considered by the authorities. We recognize the wisdom of a policy having for its object the removal of this source of infection, which is dangerous for man as well as for animals. It should be possible by rigid cleansing and disinfecting of byres, and by the condemnation of all carcases or animals known to the Tuberculous, to stop this source of infection.

"5. It is not for us to prescribe the mode in which the infection should be dealt with in the case of man. The council has skilled officials whom it can consult on the matter. But we venture to suggest that a beginning should be made with a definite attempt to stay the infection. If the public were authoritatively informed of the harmful nature of all discharges from tuberculous persons, and more particularly from cases of consumption of the lungs, and if they were encouraged to have these discharges rendered innocuous, and also to submit their houses and clothing to disinfection at intervals during the currency of the disease, and again at its close, it is believed that much good would result. With the splendid sanitary organization which Glasgow possesses, it should be possible to do much to cleanse our city from some of the principal causes of the wide-spread prevalence of this its greatest plague.

"On behalf of the Society,
"JOSEPH COATS, M.D., *President.*
"W. T. GAIRDNER, M.D.
"HUGH THOMSON, M.D.
"JOHN LINDSAY STEVEN, M.D.
"CHAS. WORKMAN, M.D.
"J. WALKER DOWNIE, M.D., *Secretary.*"

INOCULATION FOR CONTAGIOUS PLEURO-PNEUMONIA IN QUEENSLAND.

WHEN Dr. Williams first announced that he had successfully practised preventive inoculation for pleuro-pneumonia, the Royal Agricultural Society of England, despatched Professor Simmonds to Holland, to inquire into the matter. The professor, on his return, reported that there was nothing in it; that what was really imparted to the cattle by the process was not a mild form of pleuro-pneumonia, but septicæmia. Practitioners in England generally took their cue from this report, and for years the practice was denounced as "the fad of Mr. Bruce and other Australian empiricists." Time, that works wonders in all things, has completely turned the tables on Professor Simmonds, and inoculation is now generally recognised by the profession as a prophylactic. Queensland occupies a conspicuous position in the history of the practice of inoculation. It was considered doubtful by many, even by those who were ready to acknowledge the efficacy of inoculation as a preventive, whether the disease imparted by the process was true pleuro-pneumonia, and the ground for this doubt was that the operation had failed to produce the lung lesions of the disease. Dr. Germont, while in Queensland, set that matter at rest in most minds, by producing these lung lesions in a calf by inoculation in the jugular vein. Even this was not deemed entirely satisfactory by some. However, on the 25th of Novemher this year, the last link in the chain of evidence

was forged in the quarantine grounds at Indooroopilly, and evidence that will be accepted by most minds open to conviction, was produced to show that the disease imparted by inoculation is true pleuro-pneumonia in a modified form.

The facts are these: A cow belonging to W. H. Beck, the quarantine keeper, which had been born in the quarantine paddock seven years ago, which had never been outside the paddock fence, and had never been in direct or indirect contact with any animal suffering from a naturally acquired case of pleuro-pneumonia, was inadvertently permitted on 15th October last to gain access into a yard in which was lying the carcase of a calf, from which a supply of cultivated virus had just been taken. Like all quiet milkers, this cow went smelling round the carcase of the calf, and in the course of a little over three weeks, began to sicken. Prior to this, the cow had been giving a bucket of milk daily, but she rapidly dried up. On the above date—25th November—the cow was slaughtered in presence of Mr. James Irving, the Government veterinarian, who reported: "I have this day, at the Indooroopilly quarantine grounds, examined a yellow and white cow showing symptoms of pleuro-pneumonia, with a temperature of 105 3/10deg. I destroyed the cow, and upon *post-mortem* examination, found the characteristic lesions of contagious pleuro-pneumonia. Before opening the thorax, the quarantine keeper obtained a good quantity of virus in tubes, but portions of the small intestines showed small tubercular deposits. This was the only place showing any traces of tuberculosis, and it is a question whether the virus may be affected thereby."

It is worthy of notice that, although there were several cattle in the paddock, this cow was the only one that had not been inoculated. It is needless to say that, in consequence of the discovery of tubercular deposit, the virus was not made use of.

The calf from which the cow received the infection, was one which had been inoculated behind the shoulder, for the purpose of subcutaneous virus, and that this cultivation was the third *en series* from a natural case of the disease.—*Brisbane Courier.*

SUCCESSFUL LARYNGOTOMY FOR LARYNGISMUS PARALYTICUS.

UNDER the above heading, another case of successful operation for Roaring, in the United States, is recorded in the December issue of the *Journal of Comparative Medicine and Veterinary Archives*, published in New York. The reporter and operator is Veterinary Surgeon Harger, of the University of Philadelphia. The case was that of a coach-horse, 16·3 hands high, and about twelve years of age, which was sent to the Veterinary School attached to the University, because of the loud noise it made on slight exertion, and without any assignable cause—a noise which was gradually increasing.

The diagnosis being paralysis of the laryngeal muscles on the left side, it was decided that laryngotomy was the only remedy. Instead of etherization, two ounces of chloral hydrate were administered, and this answered the same purpose.

After making an incision into the larynx in front, and on the medial line, in the usual manner, the tampon cannula was inserted, and the left arytenoid cartilage carefully dissected out and dislocated from the cricoid. The mucous membrane was incised very close to the border of the arytenoid, in order to leave as much of the former as possible. The vocal cord was cut off, close to its attachment to the latter, and left in place. After the hæmorrhage was arrested, the largyngeal cavity was packed with oakum, sprinkled with iodo-

form, and the external incision closed with three sutures. The following day, the sutures and packing were removed, the laryngeal cavity washed out with carbolized water, and the cannula taken out. The breathing was slightly noisy, but this disappeared in a few days. Daily washing out with the syringe, and the application of iodoform, constituted the after-treatment. The discharge was little, and the wound healed favourably, without exuberant granulations.

Three weeks after operation the external wound had closed, and light exercise developed no noise. At the end of six weeks, the horse was able to perform his usual severe work, without any indication of roaring.

The diagnosis of muscular paralysis was verified after opening the larynx, by the state of the vocal cord.

Mr. Harger did not bring the edges of the mucous membrane by suture after the arytenoid cartilage was removed, but he states he will do so in future, as the great obstacle to success is the formation of excessive granulation from the large area of muscular tissue exposed. This can be prevented by uniting the edges of the mucous membrane with two or three catgut sutures.

At the Meeting of the Central Veterinary Society of Paris, on December 10, Professor Cadiot, of the Alfort Veterinary School, presented the larynx of a light draught horse, ten years old, upon which he had operated for Roaring, on the 14th of last April. The operation consisted in ablation of the left arytenoid cartilage, and bringing the anterior and posterior lips of the wound together by three points of suture. Recovery took place in a simple and regular manner. On the eighth day, the incision in the inferior wall of the larynx was in process of cicatrisation, its lips, which were slightly swollen, being covered by a perfectly uniform layer of fine granulations. In about three weeks, on May 7, "it only measured 2 centimetres long, and was merely a narrow seam, the edges of which were in opposition throughout. Exercised at a trot, with a man on its back, the animal made no abnormal noise in its respiration." So reported the student in whose charge it was.

The horse left the Alfort Hospital on May 27th, and was put to work soon after. It died of colic, on December 4. Veterinary Surgeon Montjauze—who had sent the horse to the School—made an autopsy, and was so struck by the regular cicatrisation of the wound in the larynx, that he forwarded it, along with the following remarks, to Professor Cadiot.

"The horse was useless when it was sent to you, and during attempts at work it made such a noise as to attract the attention of passers-by. When sent back to its owner after the operation, it was allowed fifteen days rest; then it was put to its usual work. At a trot, it at first made a slight roaring, infinitely less pronounced than previously; this gradually disappeared. During the first weeks, also, there was a little coughing during and after feeding. From the month of June, it may be said that the cure was complete."

Addressing the Meeting, Cadiot said: "In glancing at the upper orifice and inner surface of this larynx, we can distinctly see the peculiarity of the cicatrix. It measures about 2 centimetres in an antero-posterior, and 1 centimetre in a vertical direction; it has the shape of a crescent, the concavity being superior. It is more especially remarkable for its regularity, and throughout the whole surface it is covered by a perfectly smooth neoform mucous membrane, which to the naked eye only differs from the normal portion by its thinness and paler colour. In the work I have published on the treatment of Roaring, two figures represent the superior orifice and the artyenoidean cicatrix in the larynx of a horse, that died of pneumonia seventeen days after the operation; and they show that repair can take place without producing constriction in the laryngeal canal. But it might be objected that, in this instance, the time was

too short since the operation to arrive at a conclusion as to a ***definitive*** repair, so perfect that respiration could be freely effected. But the specimen I now place before you, refutes that objection. Its upper orifice and cicatrix are exactly like those to which I refer. The cicatrical retraction is accompanied by only an insignificant deformity of the superior laryngeal region—as deformity so slight as not to cause any abnormal respiratory sound.

"I may add that the function of the larynx is nowhere interfered with, when the consecutive phenomena are so simple. If, in fact, we pull the right arytenoid cartilage upwards and outwards, and the epiglottis downwards, so as to give the laryngeal opening the dimensions it acquires in deep inspirations, the mucous fold that replaces the removed arytenoid becomes tense, without encroaching on the middle line—that is if the canal is widely open."

"On this larynx is stamped the proof of the possibility of curing chronic Roaring by arytenoidectomy."

VETERINARY HONOURS AND REWARDS.

We have much pleasure in announcing that Dr. Lydtin, Superior Medical Councillor of the Grand Duchy of Baden, has had conferred upon him the grade of Officer of the Order of Leopold, by the Belgian government, for his services in drawing up new regulations for a sanitary service and a meat inspection service for that country.

The French Academy of Medicine has elected Professor Degive, Director of the Belgian Veterinary School at Brussels, a Foreign Correspondent.

The Academy of Sciences of France has awarded Professor Arloing, Director of the Lyons Veterinary School, the Lacaze prize in physiology, value £400, for "the number and importance of his physiological researches."

The French Academy of Medicine has awarded the Barbier prize of 1,000 francs to M. Lucet, Veterinary-Surgeon at Courtenay, for his memoir on "Congestion of the Mammæ and Acute Mammitis;" and another prize of 500 francs, to MM. Galtier and Violet for their works on "Forage Pneumo-enteritis." It has also awarded honourable mention and 500 francs to M. Galtier, on the Monbinne prize, for his investigations into "Pneumo-enteritis of the Sheep."

Our distinguished colleague, M. Dele of Antwerp, has been decorated with the Order of Leopold of Belgium.

ABSTRACTS ON CHAUVEAU'S EXPERIMENTS WITH THE VIRUS OF VACCINE. "A COMPARATIVE RESUME."

BY FRED. C. MAHON, M.R.C.V.S.

The Editor of the *Lancet* for January 16th, 1892, in his "Annotations," refers to some interesting, practical and scientific results already obtained by Chauveau with his "New Researches on Variola Vaccine." An abstract is given in the *Boston Medical and Surgical Journal* for December 3rd, 1891.

"His experiments were made with the product of the eighth transmission from heifer to heifer, and were exclusively performed on subjects of the bovine species. The results of his investigations are briefly as follows:

I. Vaccine Virus never gives Small-pox to Man.

II. Variolic Virus never gives Vaccinia to the Cow or Horse.

III. Vaccine is not even attenuated Small-pox, and cannot be compared to the benign anthracoid infection which is communicated to animals by inoculation with attenuated anthracoid Virus.

IV. If Vaccinia is a derivative of Small-pox, it is by reason of a radical transformation of the Variolic Virus, a transformation thus far unattainable by experimenters.

V. These last propositions lead to another more general one, which is this: The attenuation of Virus is not a physical process which can be identified with the transformation of Virus.

If these views are correct, it may very naturally be asked, how does Vaccine Virus confer immunity from Small-pox? On consideration of the results of experimental preventive inoculation we may divide them into three methods, as follows:—

(*a*) Fabrication of prophylactic substances by pathogenic agents outside of the Organism which is to be rendered immune, and the introduction into this Organism of the said substances in sufficient quantity to confer immunity, these substances having been by the proper manipulations freed from the virulent elements, properly so-called, and rendered inoffensive.

(*b*) Fabrication in the Organism to be protected of prophylactic substances by the pathogenic agents, with the germs by which inoculation has been made under conditions which ensure the benignity of their infectious effects.

(*c*) Fabrication of the Vaccinal substance by a Virus, very like the Virus against which immunity is sought, but belonging to another species. In this latter category, Chauveau places the microbe of chicken-cholera, in its function of conferring immunity, against Charbon. Here also we would place the Virus employed as a preservative from Small-pox. Whatever, in fact, may be the origin of Vaccine, though we were to admit it to be a derivative of Small-pox, it none the less constitutes in reality a morbid species, distinct from the latter. The two Viruses—Vaccinal and Variolic—are irreducible into one and the same infectious entity."

Further remarks appeared in the *Lancet* on September 26th, 1891, wherein reference was made to my "Essay read before the Fellows of the Central Veterinary Medical Society," on 2nd of July in this year, and to my opinion, that I was satisfied that, "Equine Variola" had been recognized from time to time as being something quite different from human Variola, but as nearly allied to Cow-pox, and quite distinct from Erysipelas, Urticaria, or Contagious Stomatitis Pustulosa. Secondly, that I had come to the conclusion that Horse-pox is probably identical with Cow-pox.

Alluding further to the researches made by the study of the Variolæ as a whole, we find that for nearly a century, notwithstanding that eminent Veterinarians have maintained to the contrary, seems borne out so far by Chauveau's memorable researches, that Cow-pox was Small-pox, modified by its transmission to the Cow.

The experiments of Chauveau, therefore, if unchallenged, will no doubt claim recognition at the hands of both the "Medical and Veterinary Professions." At page 134 of the VETERINARY JOURNAL, for August 1891, I alluded to the experiments with VARIOLA VACCINE, thus: "Human Small-pox inoculations on the horse are either negative, or nearly so, the positive results yielding only the most trifling evidence of infection, and nothing at all like Horse-pox, being ever produced from the insertion of Small-pox Virus into the skin of the horse, while retransmission to mankind only gives rise to Small-pox.

Chauveau's new researches on Variola Vaccine, therefore, are pertinent to the collective subject, viz.: A study of the VARIOLÆ as a whole, and are easily distinguishable and best understood by the perusal of the results of his investigations.

It is therefore to be hoped that the researches of this eminent scientist will shortly be published *in extenso*, and serve to render a most interesting series of "Eruptive Fevers" more intelligible, and from a comparative point of view of progressing utility.

In striking contrast are the following experiments, however, by experimenters in the field of pathological inquiry.

MM. Eternod and Haccius (Sem. Méd. 1890, No. 58), deduce from their experiments the following facts, obtained by them through the transference of Small-pox from Man to the Calf, whereby they were convinced that Small-pox and Cow-pox were caused by the same Virus. Chauveau's experiments are doubly interesting in consequence, being antagonistic.

For the purpose of inoculation they took Small-pox lymph from cases varying in severity, and which was rubbed into a moderately large extent of scarified skin in the abdominal region of the Calf.

The first inoculation was followed in every case by a scanty crop of pustules at the spot chosen. This eruption had at first very little resemblance to typical Cow-pox, but on transference of it from Calf to Calf it became more and more characteristic, until, in the opinion of the authors, it was impossible to distinguish it from true Cow-pox.

The Calves vaccinated in this way with human Small-pox lymph were found in every case to be refractory to Vaccination with ordinary Cow-pox lymph. (*British Medical Journal.*)

It is as well we should approach this subject carefully, as the subject is a wide one, requiring further experimentation, deep study, a wide scope of perusal, with free interchange of opinion both Medical and Veterinary. Finally, I beg to draw attention to the following opinions expressed by the aforenamed gentlemen, which appeared in the *Veterinary Record*, July 18th, 1891, page 39, taken from the *North British Agriculturist*, bearing upon the experiments of these gentlemen:—

The Identity of Cow-pox and Small-pox.—The contrariety of opinion as to the identity of these two eruptions appears to have been settled by a series of experiments on Calves and Sheep undertaken by Eternod and Haccius of Geneva. A small surface of skin is thoroughly cleansed and rubbed with sandpaper, until slight bleeding occurs, when Virus from human Small-pox pustules is rubbed in with a spatula. The eruption produced consists of a few pustules, but they are neither those of the true Small-pox nor those of the true Vaccin-pox. This altered character explains how former experimenters have insisted on the duality of these eruptions. When, however, the Virus from these first pustules by the same process of skin denudation and vaccination is applied to Calves, this second passage through the bovine system modifies and attenuates the Small-pox Virus, and typical Vaccin-pox is developed, and has been continued to be reproduced by these experimenters up to the fourteenth generation. The third generation of pustules raised from human Small-pox Virus were, it is stated, indistinguishable from those induced by the inoculation of Vaccin.

Although this process of denudation and inoculation of Small-pox Virus never failed to produce Vaccin-pox in Cattle and Sheep, the old method of incision or puncture proved uncertain, and had negative effects in horses, in which it is believed, however, that the eruption might be produced by the same methods as are successful in Calves and Sheep.

THE PARASITES AND PARASITIC DISEASES OF THE DOMESTICATED ANIMALS.

We have pleasure in announcing that Professor Neumann's most excellent and compiete work on the above subject, translated and edited by Dr. Fleming, will be issued by Messrs. Bailliere, Tindall & Cox, the publishers of the Veterinary Journal, early in March.

Reviews.

AGE OF THE DOMESTIC ANIMALS, BEING A COMPLETE TREATISE ON THE DENTITION OF THE HORSE, OX, SHEEP, HOG AND DOG. BY R. S. HUIDEKOPER, M.D. (Philadelphia: F. A. Davis, 1891.)

Dr. Huidekoper, a Graduate of the Alfort Veterinary School, Honorary Associate of the Royal College of Veterinary Surgeons, and now a teacher in the American Veterinary College of New York, has given us the most complete work on the means of ascertaining the age of the principal domesticated animals by their teeth, of any yet produced. Making liberal use of the most important treatises hitherto published on the subject, he has conferred a great benefit on Veterinary Surgeons in English-speaking—or rather reading—countries. The descriptions of the dentition of the different animals dealt with in the book are very clear and sufficiently detailed, while the illustrations are numerous and good—selected, as many of them have been, from standard works. The dentition of the pig, which has given rise to much dispute at Agricultural Shows and elsewhere, is well handled, Dr. Schwartzkopff's remarks being particularly valuable; as his observations are the most recent, and are based on his own experience and that of Professor Nehring of Berlin.

In every respect the work can be recommended as the best treatise we possess on the subject, and one which, for that reason, should supplant all others as a guide and work of reference.

BILDLICHE DARSTELLUNG DES GESUNDEN AND KRANKEN ANGES UNSERER HANSTHIERE. BY DR. JOS. BAYER. (Vienna and Leipsic: Wilhelm Braumuller, 1892.)

This promises to be one of the most scientific and beautiful works yet attempted on the eyes of the domesticated animals, in health and disease. Such a book could not be ventured upon in this country, for the simple reason that no publisher would go to the expense of producing it. The inference therefore is, that unless German publishers and authors are willing to make heavy sacrifices in the promotion of Veterinary Medicine and Surgery, the Veterinary Surgeons of the Vaterland must be liberal patrons of their professional literature. The latter surmise is, no doubt, the correct one, and the thorough scholastic scientific training they receive, as well as their high standard of general education, will account for the abundance and the excellence of their literature.

Dr. Bayer, who is professor of Surgery and Operative Surgery at the Vienna Veterinary Institute, appears to have made a special study of Veterinary Ophthalmology, and has determined to give the medical world the result of his labours in the beautiful work just appearing in parts. The second part is now before us, and we have nothing but admiration for the twelve plates of coloured lithographs it contains—exhibiting, as they do, the very perfection of colour-printing. The illustrations of the various forms of eye disease are superbly and most instructively delineated. We heartily congratulate author and publisher on their achievement, for which they certainly merit the lasting gratitude of Veterinary Surgeons and the ophthalmologists of man, for all time.

THE JOURNAL OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND FOR DECEMBER.

The number of this Journal for the last quarter should possess much interest for agriculturists, as it contains several instructive papers by high authorities. The only one which might attract the attention of members of the Veterinary profession is on Abortion in Cattle, by Professor Brown, in which there is a summary of our present knowledge on that rather important topic; but unfortunately there is nothing added to the information we already possess—nothing as to the investigation reported as now taking place.

Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

New Members of the Profession.

At a meeting of the Court of Examiners held in London on and between December 14th and 18th, 1891, the following students from the Royal Veterinary College passed their Final Examination and were admitted Members of the Profession:—

Mr. J. H. Taylor, Withington, Manchester
" W. H. Williamson, Crouch Hill, N.
" Geo. de Lisle Tinkler, Derby
" T. F. Macdonald, M.B., Glasgow
" A. P. Case, Cardiff
" G. D. Martin, Gravesend
" Geo. C. Becket, Montreal, Canada
" *J. E. Fowler
" M. Jacobs, Maida Vale, W.
" A. Crofts, Bedford
" J. E. Wallis, Leigh, Tonbridge
" *E. H. Simmons
" D. G. Davies, Gowerton, S. Wales
" G. A. Wickett, Redruth, Cornwall
" G. S. Thomas, Hackney, N.
" C. W. Howard, Heston, Middlesex
" J. F. Kemp, Edgbaston, Birmingham
" H. A. Sullivan, Northampton
" *J. Maguire
" W. Wadsworth, Southport, Lancs.
" J. H. Lockword, Cherrytree, Sheffield
" W. J. Cade, Brandon Hill, Bristol
" E. W. Morris, Uckfield, Sussex
" A. A. Stevens, Durham
" G. S. Harris, Camden Town, N.W.
" F. W. Evans, Camden Town, N.W.

The following gentlemen passed their Second Examination.

Mr. B. P. Godfray	Mr. J. P. Burr	‡Mr. S. Burton
" T. J. Hawkesworth	" J. W. Thomas	" J. S. Porrett
‡ " W. C. Watts	" A. C. Oliver	" F. Mosedale
" R. S. Falshaw*	" F. Scott	" E. Ringer
" A. B. Holland	† " H. Reynolds	" E. Clode

The following gentlemen passed their First Examination.

Mr. F. F. Macarthur	‡Mr. E. H. Fisher	Mr. E. L. Stroud
" E. Bell	† " W. Fowle	" P. G. Saunders
" J. W. Baxter	" F. R. Henton	" F. S. Stanley
‡ " W. Davies	" C. M. Lawton	‡ " R. Burrell
" L. Barnard	" F. H. Pagson	† " T. E. Jones
" H. Sturge	" P. A. H. Over	" J. A. Craft
" G. W. Freer	" H. Barnard	

* These have not yet complied with the rules of the College.
Marked thus ‡ passed with great credit.
" " † " " very great credit.

Arthur W. Hill,
Secretary.

At meetings of the Board of Examiners held in Edinburgh and Glasgow on and between December 17th and 24th, the following gentlemen passed their Final Examination and were admitted Members of the Royal College of Veterinary Surgeons:—

GLASGOW VETERINARY COLLEGE—

Mr. James Bishop, Glasgow
" John Campbell, Rutherglen
" W. Packmann, Bury
" R. Campbell, Kirkcudbright
" W. Marshall, Drummore, Wigtown
" T. F. Renshaw
" A. Hamilton, Glasgow
" C. T. Holmes, Bishop Auckland
" W. M. Williams, Groeslon, Carnarvon
" L. Crook, Eccles

DICK COLLEGE—

Mr. H. Eve, Liverpool
" J. Mitchell, Stranraer
" W. H. McArthur, Mussoorie, India
" P. McDonald, Edinburgh
" M. Pottie, Paisley
" G. F. Prickett, Birmingham
" W. J. Richardson, Dublin
" J. Tainsh, Perth
" G. Thompson, Rhynie, Aberdeen
" G. H. S. Jarrett, Glasnevin, Dublin

NEW COLLEGE—

Mr. A. W. Bland, Wrangel, Lincolnshire
" R. J. Bushnell, Abergele
" M. J. Carroll, Limerick
" J. Connochie, Ayton, Berwickshire
" J. T. Clanchy, Charleville, Cork
" A. J. Dalgleish, Newcastle
" O. Ducksburg, Lancaster
" J. Halliwell, Bolton
" T. Lanchester, Bishop Auckland
" J. Norbury, Altringham
" R. Taylor, Leeke, Staffordshire
" J. McL. Young, Dundee
" W. C. Patrick, Perth
" C. D. Wishart, Haddington

The following gentlemen passed their Second Examination :—

GLASGOW COLLEGE—

Mr. J. Pottie
" D. P. Harvey
* " J. McDougal
" F. W. Thompson
Mr. W. McMurray
" J. Gillies
" J. McKie

DICK COLLEGE—

Mr. Blackburn
* " M. Dugdill
* " T. J. Foulkes
" E. R. Gibson
" E. Hall
" J. A. Hepburn
" C. Hill
Mr. L. P. Knight
* " J. W. Masheter
" W. Mills
" J. W. McIntosh
" T. J. Nolan
" J. Peddie
" E. H. Pratt

NEW COLLEGE—

Mr. H. W. Deakin	Mr. R. T. Hutchinson
„ H. G. Hewitson	„ A. B. Tully

The following gentlemen passed their First Examination :—

GLASGOW COLLEGE—

Mr. D. McGeoch	Mr. A. S. Adams
„ D. Evans	„ W. L. Webster
* „ H. J. Maxfield	

DICK COLLEGE—

Mr. W. T. Aulton	Mr. D. B. Ritchie
„ T. J. Batty	„ D. Reid
„ W. Brown	„ J. D. Richardson
† „ A. Fletcher	* „ K. Roberts
* „ W. J. McConnell	„ A. Wilson
* „ H. E. Powell	

NEW COLLEGE—

Mr. M. Broomhead	*Mr. J. A. McGowan
„ J. W. Cowx	„ W. Rostron
„ S. Fenney	„ F. J. Taylor
„ A. Ferens	„ W. Wintle
* „ F. C. Fountain	„ J. H. Yates
„ A. J. McDonald	

Marked thus * passed with great credit.
„ „ † „ „ very great credit.

R. RUTHERFORD, F.R.C.V.S.,
Secretary to the Board of Examiners.

THE CENTRAL VETERINARY MEDICAL SOCIETY.

(Concluded from page 61.)

I would advocate the making of some compensation for all horses slaughtered under the provisions of the Act, whether they be affected with glanders or with farcy. It has been said that the so-called *cured* cases of farcy are the most dangerous, and conduce mostly to the spread of the disease. I do not consider this is so ; the ordinary London and suburban horse-owner has a wholesome dread of anything approaching a thick, or humoury, or "farcied leg," and would not readily buy a horse with such. But he knows little of the occasional cough, the leaden appearance of the septum nasi, and thinks an unthrifty coat and a slight discharge from the nose is only a cold ; yet how many of such horses, sold privately and in repositories, at the instance often of large and rich firms, are bought by smaller men, put to work, break up with glanders, and upon *post-mortem* examination show glander-tubercles of old standing, the disease, by good care and treatment, having been temporarily suppressed. Cases such as these, and the horses which have been working with or standing by glandered animals, and which are disposed of in consequence, are, in my opinion, the chief cause of the non-diminution of glanders in the country. Again, if compensation were to be given in cases of farcy only, where is the line to be drawn between farcy and glanders ? It is one disease, and although we can call to mind cases of farcy in a limb where no physical indication of the existence of the disease in internal organs was discoverable, even on *post-mortem*, such cases are extremely rare. In the great majority of cases—I may say in almost

every case of farcy—indications of the presence of the disease in the lungs are discoverable.

Now, how would the granting of the compensation be beneficial?—how would it tend to stamp out glanders and farcy? Firstly, the owner of a patched-up, suspicious, farcied, or glandered horse would have no inducement to sell. He could not warrant his diseased horse, fearing ulterior risks; and by reporting to the authorities he would get perhaps £10 or £12, this amount equalling what an unwarranted horse would be likely to realise on the market. Secondly, he would report the disease earlier, for he would lose his compensation if the animal died before being inspected, or if the authorities discovered the existence of the disease for themselves, or considered unnecessary delay had occurred in giving notice of the outbreak. And, thirdly, and perhaps chiefly, the authority who pays the compensation would at once take very active steps to suppress the disease. The very moment they are called upon to part with money, they would make provision for the periodical inspection of infected studs; for regulating and tracing the movements of horses from stable to stable, even if in the same occupation; they would stop the wholesale disposal of studs where the disease has recently existed; they would endeavour to trace each new outbreak to its source: and would doubtless go into such smaller details as the compulsory suppression of the use of nose-bags, and the provision of a better system of public water-troughs. It seems to me that, were immediate slaughter compulsory, compensation given, and some such regulations as I have indicated enforced, this country would in a few years be free from glanders and farcy, perhaps even before it is free of pleuro-pneumonia.

The source from which the necessary amount of funds is to be taken, is not a question which we, as veterinary surgeons, have to consider. Recently, by a special Act of Parliament, funds have been granted out of the Imperial Exchequer for the suppression of pleuro-pneumonia. The compensation in swine fever is paid out of the Local Rate; and by the Contagious Diseases Act of 1886, the Privy Council have the power for directing, if they think fit, the payment of compensation in the same way for animals slaughtered when affected with glanders. It occurs to me that, if the legal difficulties in the way are not insurmountable, the most equitable way of raising the money would be to impose a tax on horses sufficiently large to cover the amount required for making compensation, and for carrying out the necessary details. Such an impost would not be large, would be local in character, and would fall on the horsekeepers, the very persons who would reap the present benefit—*i.e.*, compensation for their diseased horses—and the future advantage of having their studs free of this costly disease. Such a course would at most be but a system of mutual insurance amongst horsekeepers.

And now, gentlemen, a few words as to disinfection, and I have done. Disinfection, in the case of all diseases, to be of service must be thorough, and if properly carried out will be a very important factor in the suppression of glanders. Luckily, the bacillus of this disease when outside the body is easily destroyed, and does not leave spores or reproductive particles behind it. Dr. Sims Woodhead has shown that the organisms die at a temperature of 131 F. and he points out that the washing out of infected stalls with boiling water would be of immense benefit; he also states that a 4 per cent. solution of carbolic acid, if applied to the nasal discharge for one minute renders it innocuous; and practically we know that thorough washing with boiling water, and lime washing with a wash containing carbolic acid, chloride of zinc, or chloride of lime is a cheap and certain method of disinfection in this disease: due care of course being taken that the stable utensils are not neglected, the floors not unsound, and that there is a plentiful supply of that important disinfectant—fresh air.

Discussion.

Mr. HUNTING said it was difficult to rise immediately after hearing the paper read and criticise it properly, but he would endeavour to follow it as closely as possible. He entirely agreed with Mr. Villar as to the sole cause of the disease being a specific organism, and therefore it can never arise *de novo*. Fortunately the virus was one that did not retain its vitality long, and therefore it should be one specially fitted for stamping out. He believed that the spread of the disease was nearly always effected through the stomach, and the chief means of infection were nose-bags, mangers, and water-troughs. He was glad to hear Professor Simonds was of the same opinion as himself as to ingestion being the method of infection, and not inhalation. It had often been shown that the disease could be communicated through the stomach; it had never been shown that it might spread through the respiratory membrane. As to the distribution of the disease, Mr. Villar showed that London was the great centre in which it existed, and that the surrounding counties came next. In Wales the disease was absent, and in Scotland only one county was infected. He (Mr. Hunting) had said that many other large towns were infected, but did not report their cases—probably he should be reminded of this. It was true that some years ago he had evidence of this unreported disease, but from recent enquiries he was led to believe that very few cases were now hidden away. The disease was decidedly on the decrease, but more cases were reported, so that, although a few years ago the returns were very erroneous, he believed now they fairly represented the number of cases and its distribution. In London very few cases escape being reported ultimately, although no doubt some are slipped through the horse-slaughterers, and some find their way into the surrounding country districts, Many cases which recover or are "patched up" are not reported at first—they are sold, and pass to other stables, spreading disease, but when their final attack comes they are reported, so that the returns may be accepted as very nearly including all the animals that die or are killed for glanders and farcy.

Mr. VILLAR stated his belief that the disease could, by proper regulations, be stamped out, and with one solitary exception he never heard anyone say that it could not. Mr. Villar proposed that any amendment of the Act should provide for the earliest destruction of both glanders and farcy. With this he quite agreed, for there could be no doubt that one form was quite as effective in spreading contagion as the other. He was also in accord with the essayist in saying that the traffic in "suspicious" farcied and "in contact" animals was the chief factor in spreading the disease. Mr. Villar recognised that some compensation for *all* the horses slaughtered would greatly assist the extermination of the disease, and he (Mr. Hunting) was prepared to allow that the arguments were strong for including more than farcy in any compensation scheme. He had proposed compensation for farcy only, under the idea that it would lead to the co-operation of horse-owners in carrying out the regulations. He did not propose compensation for marked cases of glanders, because the law now required their destruction, and there was no hardship in destroying a horse which was dangerous and incurable. This evening he was forcibly struck with the difficulties of arbitrarily dividing the different forms of the disease, especially in providing for those most indefinite cases described as "suspicious." He would recognise the argument in favour of slaughtering and giving compensation for all these as well as for farcy. There is a distinction between glanders and farcy; the present Act recognised this by its regulations, and did not insist upon slaughter for farcy. If some horses can be cured and others rendered useful for work, it was a hardship to compel the slaughter of these others without giving compensation. Slaughter was necessary to successfully stamp out the disease, but the necessity was for the

good of the whole body of horse-owners and the national welfare, so that the individual owner ought not to be compelled to suffer entire loss for the good of the community. Mr. Villar pointed out that if the authorities were compelled to give compensation they would undoubtedly increase the stringency of their regulations. He quite admitted that, and believed that when horse-owners saw they would be assisted with their losses, and protected from fresh invasions of disease, they would heartily co-operate with the authorities, and willingly submit to extra stringency. He believed that with compensation for farcy and for doubtful cases, with more stringent regulations, and the increased popular knowledge of the disease, only a very few years would be required to stamp it out. He also believed that the amount or compensation required would be far below the annual cost now caused by the disease, and of course it would be a rapidly decreasing amount each year as the disease gradually disappeared.

Mr. DOLLAR said that the great question was that of giving compensation for farcy. The profession had been pretty unanimous on the subject, although some of them were so far behind as to believe it impossible to stamp out the disease. The question was complicated, as they had so many contradictory opinions. The compensation clause was an exceptional portion of an exceptional measure. The only diseases for which compensation was given were pleuro-pneumonia and swine-fever, and in a few unusual instances foot-and-mouth disease. As all these diseases were exceedingly infectious, it was quite impossible to determine how many contact animals were affected, and therefore it was considered advisable to slaughter infected and suspected alike. The hardship of slaughtering healthy cattle was met by compensation. But the law was quite clear on the point that where it stepped in and destroyed an animal already affected with a fatal disorder no compensation was due. This was further shown by the fact that the Contagious Diseases (Animals) Act, 1878, ordered local authorities to slaughter "contact" animals and give compensation. In the case of pleuro-pneumonia, the number of healthy slaughtered exceeded in 1890 that of diseased nearly six times. Under the new Act it was nearly ten times. These facts he thought, disposed of the attempted parallel between pleuro and farcy.

The system of compensation had had the advantage of being in operation for 12 years; people had become accustomed to it, and it was administered in a most liberal manner. Prof. Brown's report (1890) says: "The compensation is paid on a fair and liberal scale, and with a full recognition of the cost of replacing the cattle slaughtered; and the slaughter is carried out by officials of the Board in such a way as to cause the least possible inconvenience to the owner. . , . . So soon as the cattle have been slaughtered the compensation due from the Board is at once paid. The premises are thoroughly cleansed and disinfected at the expense of the Board, and afterwards the owner is allowed, with the least possible delay, to continue his usual business." Now what is the result? To go back a little they would find in the report for 1884, "Even the owners of dairy stock have said in plain terms that they prefer letting the disease run its course in the herd to the alternative of slaughter and compensation to the full value of the animals," and again, "In the face of the plainly expressed objection of stock owners it was not considered desirable to direct it." Similar remarks were made in each succeeding year, and even in 1890, after 12 years' working, we read "Another source of difficulty encountered by the Board arose from the disinclination of owners of dairy stock to make the existence of the disease known." Now if the education of the past 12 years, the knowledge of the dangerously infective character of the disease and the very full and liberal interpretation of the compensation clauses have failed to secure the reporting of pleuro, can they expect a *new* measure, dealing with a *contagious* malady—and that by no

means excessively so—and backed by half compensation only, to be productive of better results. I said *better* results. What are the results produced by compensation for pleuro? In six years the deaths have increased six times. In 1884 1,731 cattle were slaughtered for pleuro. In eight months of 1890 the figures had risen to the enormous total of 7,343, or at the rate of 10,964 per annum. For this slaughter the country was mulcted at the rate of £114,999 per annum, and the result has been failure—absolute failure. On the 1st September, 1890, a new and more stringent Act was passed, under which we shall doubtless have to pay more dearly than ever.

But if compensators have their way this will not be the worst. Mr. Hunting bases a claim on the fact that it is possible to patch up cases of farcy and sell them. I say on Mr. Hunting's authority, that it is possible to patch up cases of glanders, and if this is not sufficient I can adduce the support of the late Prof. Robertson (p. 112 : 130.) Now if we must compensate men because farcy can be patched up we must compensate equally for glanders. And the evil will not stop there, for on Mr. Hunting's other principle that "compensation is due to the man who suffers for the benefit of others" we must include anthrax and rabies, and probably tnberculosis.

The second point is what would compensation cost? Let us consider farcy alone. First I will quote Mr. Hunting: "If a small compensation were given for farcy (Mr. Hunting suggests half-value) every case would be reported, and the two diseases would probably be stamped out entirely in three years . . . . Compensation of £10 would at most amount to £10,000 a year. The utmost cost to Government would amount to 5 years' compensation, £50,000." On the same page—"Unless this be done we shall continue our annual loss of £30,000." On Mr. Hunting's own figures compensation at half rates already amounts to £15,000. In his book on glanders he says "The whole country loses annually 4,000 horses of the average value of £15—a total loss of £60,000." At half value this would be £30,000, *i.e.*, three times as much as Mr. Hunting's first estimate. Towards the end of the book, is a table extracted from the report of the Privy Council with the following footnote: "If these figures be multiplied by five an approximation to the annual loss of horses by this preventible disease will be arrived at." Now I want, as far as possible, to act fairly in this matter, so I will take last year's farcy statistics, which were small, for the basis of another calculation. The number is 861, multiplied by 5 we get 4,305. At the £10 rate of compensation this will be £43,050. You will note we are still rising. Now the cause of Mr. Hunting's agitation is that many horses affected with farcy are never reported—in fact he thinks as many escape as are reported That would bring his figures up to a grand total of £86,100. His remarks are, however, in entire accord with those of the inspectors of the Privy Council Office. In 1884 attention is directed to the singularly large number of cases of farcy in the London district. In 1888 the annual report says "The County of Middlesex and the metropolis contributed no less than 756 out of the 920 cases returned in the whole of Great Britain; the county of Lanark comes next with a total of 69 leaving only 95 for the rest of the country. Such a return must be regarded as very unsatisfactory, as it is scarcely possible to believe that only two cases could have occurred in the county of Lancaster, with all its large cities and boroughs, and in the county of Durham not a single case occurred." Again in 1890 "It seems very strange that Lancashire and Yorkshire, with their large towns in which horses are kept and worked in much the same way as they are in London, should be so free from the disease." But the figures speak more eloquently than any words. Last year 861 cases of farcy were reported in Great Britain; of these London and the metropolitan counties contributed 847, leaving 14 for all the rest of England, Scotland and Wales.

To avoid the insinuation that I am a destructive critic only, I suppose I

must make some suggestion for dealing with this condition. It seems allowed on all sides that the evil results from sale of "patched up" horses. And here again we may learn something from pleuro-pneumonia. The annual report of the Board of Agriculture for 1890 says, "It appears then from the above table that the restrictions on the movement of animals during the years 1880-84, had more effect in reducing the number of outbreaks of pleuro-pneumonia in Great Britain than the slaughtering of the affected cattle, or even the slaughtering of the diseased and those in contact as carried out by the local authorities." If then we can restrict the sale of farcied horses, we may hope to check the progress of the disease. I would therefore suggest that in every case where farcy or glanders breaks out in a stable, all horses in the same stable, or which may have been in contact with those affected, be branded on the hoof with a distinguishing mark, so as to be readily recognised by anyone. This mark will take a varying period of from 6 to 8 months to wear out, and during that time the horse can be readily detected and examined, and his sale becomes impossible. There is no need to stop him working. It seems that farcy is not frequently caught when at work, and, of course, this measure would in no way interfere with the working of the Contagious Diseases (Animals) Act. If a branded horse suffering from glanders or farcy were detected at work, there would not be the chance that now exists of pleading ignorance—swift and sure punishment would follow. A very valuable suggestion was to place at inspector permanently at each of the slaughter-houses to inspect every pair of lungs. In this way no farcied or glandered horse could be slipped past, and infected stables would rapidly be localised. Another suggestion made was that a permanent salary of £400 or £500 a year should be given to inspectors, and that private practice should be forbidden to them. Lastly, I think it very necessary that every veterinary surgeon should be obliged to report cases of farcy or glanders as soon as seen. The same kind of thing is done by the medical man, and if the slaughter-houses were properly watched, there would be no danger of concealment and treatment of the disease by unqualified men.

Mr. HUNTING said there had been no slaughter of "contact" animals for pleuro prior to 12 months ago.

Mr. SAMPSON said he agreed that London was the seat of the disease. Out of the last dozen cases he had seen, nine came from London. The whole question was one that would require a great deal of consideration. He had very great doubt whether compensation would stamp out pleuro-pneumonia, in fact, he was rather inclined to think it would not. There was no difficulty at all under the present Act. A man reported an outbreak, and the official had the animals slaughtered, and he got his money and then put in a fresh stock. There were two men that did this thing continually, and so far as they were concerned the disease had been spread. He did not believe in the Government killing a man's animals without paying him—it seemed hard, but at the same time there were many in London who would be glad to buy glandered horses with a view to getting compensation, and in that way compensation was as likely to spread the disease as to stay it.

Mr. SHEATHER said it was no uncommon thing for the owner of 100 horses to lose three in a week. He did not think the disease was so prevalent as it was 20 years ago, and it was passing into a new phase too. For every three or four cases of farcy in the stables he saw 15 of glanders. If the matter was to be dealt with, it must be dealt with thoroughly and from the very root. There was not the slightest doubt it could be stamped out—if it was out of the stables then it would be out of the town. In large stables the veterinary surgeon did not carefully inspect every horse, and without this was done the disease could not be got rid of. "Suspicious" horses formed a large class and they must be taken into consideration in any question of giving compen-

sation. disease could never be stamped out in three years, but it might be done in twelve years. He had known a case of farcy continue over six years and then break down into glanders.

Mr. BRAY said this was one of those things which they all agreed was of great importance to horse-owners, especially to such large owners as omnibus proprietors and tramway companies, although private or small owners suffered considerably from the number of animals slaughtered. He quite agreed that it was a most difficult disease to deal with. What were they to do about the "suspicious" cases? Out of a stable of eleven horses he had known nine to be suffering from glanders or farcy. The two were put by themselves, and for one or two years they were not considered even suspicious, but some time after one of them showed symptoms of farcy, but the other showed no symptoms and was kept on till some months after, when it also showed symptoms—three years after the outbreak.

Mr. SHEATHER asked if there were any cases reported in Ireland.

Mr. DOLLAR said there were no statistics given in the English Report of any disease in Ireland, although he believed the Act related to Ireland, inasmuch as it made provision for £20,000 in dealing with pleuro-pneumonia.

Vet.-Col. DUCK said it would be of great service with regard to suspicious cases if they could readily determine if it was a specific infectious disease or not.

Mr. CATON said he should like to know whether it was legal or not to inoculate animals, because he had been told that it was illegal. If he had a doubtful case given to him he should undertake the donkey inoculation test. He heard that it was the first test used in the army. Compensation he considered very complicated. He would also like to know whether it was possible for an animal to be affected locally and recover?

Mr. ROGERSON said that so far as his experience went, the chief source was from the large stables, and he had come across a large number during the last ten years. The Act should be rigidly enforced by inspection and all suspicious cases thrown out and isolated. Farcy was a most difficult question. He moved that the discussion be adjourned seeing that it was such an important subject and the late hour inconvenient for Mr. Villar to reply.

Mr. CATON seconded the motion which was carried *nem con.*

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING of this Association was held at the North Eastern Hotel, Darlington, on December 4th, 1891, Mr. W. AWDE, President, in the chair. There were also present Messrs. W. A. Hancock, Newcastle-on-Tyne; J. G. Deans, Bishop Auckland; G. E. Nash, Richmond; F. R. Stevens; W. N. Dobbing, Darlington; and Mr. Nish, Northallerton.

Apologies for non-attendance were received from Professors Walley and Williams, Messrs. Thos. Greaves, P. Smith, W. T. Briggs, and H. Gelsthorpe.

The PRESIDENT reported that since the last meeting he had received an invitation from the President, Vice-Presidents, and Governors of the Royal Veterinary College, to luncheon, on Monday, October 19th, 1891, to celebrate the Centenary of the College, which he accepted, and which was in every way successful.

Morbid Specimens.

Mr. NASH produced the heart taken from the well-known hunter "Cock Robin," which had died at Richmond that morning from endocarditis.

Mr. NETTLETON sent a dermoid tumour removed from the cartilago nictitans of a bullock.

Mr. DEANS reported on the outbreak of anthrax which had come under his notice, and which he was unable to account for, unless it was possible for the disease to have been contracted from the cake on which the animals had been fed.

The PRESIDENT also brought forward the case of a mare showing cerebral symptoms which, on *post-mortem* examination, had considerable effusion on the brain, and also two small tumours were found, which Professor McFadyean identified as belonging to the class psammomata.

Methylated Tincture: Inland Revenue Notice.

Mr. STEVENS then, according to notice on the paper, drew the attention of the members to the fact that veterinary surgeons are liable to be prosecuted by the officers of Inland Revenue if any tincture or other preparations in which methylated spirit entered, were found by them in their surgery, unless the formula of same had been submitted to and approved by them. From what he said, it seemed that he had been served with a notice by the local officer, since which time he has been in communication with the department, which correspondence was read to the meeting. It was unanimously resolved to call the attention of the Royal College of Veterinary Surgeons to the matter, with a view to its being remedied, and also to communicate with the local members of Council before the next meeting.

A paper was then read by Mr. W. A. HANCOCK, on

Tuberculosis, its Prevention and Suppression.

He said: When our esteemed President and Secretary asked me about a month since if there was any subject I could introduce to this meeting for discussion, my first impression was that there was no other reply but a negative one that I could give, but on reflection it occurred to me that the Secretary of a Society like this must sometimes be on his beam ends, so to speak—the sympathetic side of human nature intervened, and you see me here to-day making a humble effort to introduce, in my judgment, one of the most important questions for discussion that could be mentioned.

Although it may occur to many of you that this subject has been thoroughly gone into and discussed in a most exhaustive manner (particularly during the past year) at various meetings, where it has not only had most excellent papers devoted to it, but has also had a vast amount of very valuable information imparted through gentlemen well qualified to speak on the subject, not only in this country, but also by eminent men from all parts of the kingdom; yet nothwithstanding all that has been contributed by both the papers and the discussions, the most important part of the subject has been left out in the cold. I refer to the suppression and the prevention of the disease, which must of necessity sooner or later cccupy the closest attention of the veterinary profession.

The scientific aspect of this question has been treated very elaborately by many eminent members of both the medical and veterinary professions, and there are no contributions, to my mind, which deal with the disease theoretically in a more exhaustive and complete manner than the papers read by Prof. McFadyean at the recent meeting of the National Veterinary Association at Doncaster, and also at the Hygienic Congress, held in London this year, and if any of you have not yet had the opportunity of reading them, I should strongly recommend a perusal. Now, Gentlemen, the time has arrived when some practical scheme should be devised, and you will, I believe, agree with me that some attempt should be made as soon as possible, to endeavour to prevent the occurrence of tuberculosis, and also to suppress it when known to exist. That it is a very complex question to deal with

everyone will admit, but because it is a very difficult problem to solve that is no reason, at least so far as I can see, why we cannot face the question, and introduce some scheme for its suppression and prevention. It is only by this method that any capable means of doing any good in the way of preventing the spread of tuberculosis from animal to man and from one animal to another can be effected; and if the powers that be could only be induced to take the question up, and have introduced some Act which shall be guided by the central authority, and worked under the same control all over the country, I firmly believe a great amount of good would accrue in a very few years.

We will assume that the authorities have power to take this question up; it would be necessary to have appointed veterinary inspectors whose whole time should be devoted to the work. These inspectors to have power to examine from time to time cattle, *especially dairy stock*, with a view to the detection of tuberculosis (particularly pulmonary tubercle) and in the event of there being no reasonable doubt in the mind of the inspector that he has a case of tuberculosis in any place, power be given him to have the cow isolated and valued at its present market value and subsequently slaughtered and compensation given to the owner. By this means we shall not only be arresting the spread of tuberculosis by breeding, which I believe does take place, but we shall at the same time and with the same powerful weapon, be in some measure preventing risk of communication to mankind through the milk supply of infected cows. We all know that the same danger of infection does not exist in store stock as in milking cows; in the former the life is cut short by the butcher, and consequently the risk of danger limited, whereas in dairy stock an animal may have been the victim of the disease for some time, and the milk used day after day, in fact the milk of such animals is used until it is either a case of sending for a knackerman or what is more common, of killing and burying them on the premises, without saying anything to anyone. Therefore seeing the principal danger lies with dairy stock in the first instance, *they* should have a most exhaustive examination, particularly those dairies in close proximity to the large cities and towns all over the country. It is of very great importance that the traffic in these old "wasters" should be stopped, and thus terminate the unwholesome trade in this class of cattle. This can only be done by purchase, slaughter and compensation at a rate to be fixed by those in authority, and in my opinion full value should be given, that is to say, the value of the cow at the time of slaughter. This will perhaps be the means of inducing the owners of such cattle to report when they have such, for it would be for their own benefit, as they would get a fuller compensation by reporting when a cow is first noticed.

Perhaps it will not be out of place if I just mention one of the arguments that will be brought against the adoption of a scheme for the diminishing of the number of animals suffering from this disease—that argument is advanced by many eminent members of our profession—they say it is impossible to correctly diagnose the disease in the living animal. I admit it is the case in many instances, but in the *great majority of cases*, particularly when it exists in the chest, it is a tolerably easy matter to differentiate between this and other affections of the lungs of cattle. Is there any disease in which you can in all cases come to an absolutely correct opinion as to diagnosis? Just remember the terrible mistakes that have been made concerning pleuro-pneumonia, swine-fever, anthrax and other diseases. I feel firmly convinced that a great deal of that want of power to diagnose would arise in many instances from the lack of opportunity to examine cattle in that condition; and although there is no desire on my part to be egotistical, I will just say that I have perhaps enjoyed facilities for the examination of cattle suffering from tubercle, second to none, for I happen to be in a district where we have many small dairy farms, and it is in this class that it plays such sad havoc,

and spreads from animal to animal just in the same way as any other contagious disease, only that it is extremely slow and insidious. Further than this, opportunities have presented themselves for the examination of cattle in large numbers, and afterwards the proof of the correctness or otherwise of the opinion formed; and the conclusions that present themselves to my mind are—

1. That it is not a particularly difficult task to diagnose tuberculosis, especially in the lungs of the living animals, even without the history to guide you.
2. That this has been proved conclusively to my mind, almost without exception, by the aid of a *post-mortem* examination, which furnished complete proof as to the result of examinations made before slaughter.

I will now for a moment or two endeavour to show you in what respect we are behind a very near neighbour of ours (Denmark) in this matter. You are all probably aware that at present there is no Act in this country to prevent a cow-keeper from using or selling the milk from a cow suffering from tuberculosis, and this, is, to say the least, a very deplorable fact. What do we find the case in respect to the milk supply of Copenhagen? The Copenhagen milk supply was started in 1878 through the efforts of a Mr. Busch, its object being the supplying of the inhabitants, especially the infant population, with pure and unadulterated milk, and among other valuable provisions for attaining this desirable object are the following:—The cows on the various farms are examined every fortnight by competent veterinary surgeons. The veterinary surgeon not only certifies as to the cleanliness of both cows and cow-houses, but also as to the cows suffering from tuberculosis, actual or suspected. Beyond this, if a veterinary surgeon declares a cow to be suffering from tuberculosis, that animal must be immediately separated from the rest of the herd and got rid of as soon as possible. Now just to show the results of that trial (I will call it), what do we find? In the year 1890 alone 120 cows were withdrawn on account of tuberculosis. The disease was found on 37 farms out of 49, only 12 being free: 337 cows were withdrawn (temporarily) from contributing to the milk supply for other diseases. The only drawback in my opinion is that the tuberculous cattle are not condemned to be slaughtered. I think no one will dispute the fact that results like these speak volumes, and if something in a similar direction could be effected here in England, we should have equally good results.

Briefly, what is required is—

1. Periodical examinations of all dairy stock by veterinary inspectors.
2. Isolation and slaughter of all condemned cows.
3. Compensation to the owner.

Beyond this, every dairy should be licensed, and that license should be liable to be endorsed if any non-fulfilment or disregard of any Acts takes place, not only in respect to this disease but other contagious or infectious diseases; three endorsements to cause the license to be withdrawn.

There is at present a movement going on with a view to giving compensation for farcy, and although it is not my wish to say that it is not necessary, I will say that it is not half as urgent and requisite as the taking up this question of the Suppression and Prevention of Tuberculosis. That this latter question is surrounded by many difficulties which appear almost insurmountable all will agree, but I feel firmly convinced that if some move in the direction that I have named were adopted in the country, we should have at least done our duty, and at the same time effected a great deal toward getting rid of this fearful scourge, which is not only of incalculable danger to mankind, but is also the cause of such disastrous losses to the owners of stock throughout the country.

I thank you all, gentlemen, for the kind and patient hearing you have given me while bringing before you these rough and crude remarks, and hope that you will give expression to your views upon the question.

A good discussion followed, the general opinion expressed being that it was high time something should be done in the matter. It was generally believed that the greatest difficulty which presented itself to the authorities was that of the expenditure which it would involve; and not that of recognising the disease as asserted by some. The general feeling was that tubercular disease amongst dairy cows is of more frequent occurrence than it used to be some years ago.

Mr. Hancock was then accorded a hearty vote of thanks for his paper.

THE WESTERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE half-yearly meeting of the above Association was held at the Rougemont Hotel, Exeter, on December 17th, 1891. The President, Mr. William Penhale, F.R.C.V.S., of Barnstaple, occupied the chair, and there were also present Professor Axe, London; Messrs. S. Burton, Torquay; J. A. Collings, J. P. Heath, W. B. Nelder, S. Pethick, and W. Roach, Exeter; G. Golledge, Sherborne; T. Olver, Truro; R. E. Penhale, Hatherleigh; W. Penhale, Holsworthy; F. Place, Exmouth; and the Secretary, W. H. Bloye, Plymouth.

Letters and telegrams regretting inability to attend the Meeting were received from Professor Penberthy, Messrs. Chase, Parsons, Stewart, James, Harvey, Elder, Oliver, and Veterinary-Captain Ringe, A.V.D.

Messrs. Collings, Plymouth, and Gibbings, Tavistock, were unanimously elected members of the Association.

The President in referring to the recent Congress on Hygiene and Demography, held in London, and which he had attended as a delegate of the Association, testified to the manner and importance of the work done by members of the Veterinary Profession in Section 3—that referring to the communicability of disease from animals to man.

Mr. GOLLEDGE gave an interesting description of the cases of two cows which had recently come under his care. The animals had suffered from nervous excitement, which ran on to paralysis, and eventually terminated in tetanic convulsions. Many of the symptoms simulated those of hysteria, but others differed so completely from those of that affection, that he was unable to reconcile their identity.

Professor AXE then delivered a most able lecture upon "Epilepsy and some Epileptiform Diseases."

After thanking the Society for the honour they had done him in inviting him to Exeter, Professor AXE said the subject of neuro-pathology in the lower animals had received but scant attention from the veterinary profession, and although it might not present those elements of interest arising out of psychological considerations, which rendered the subject so important and attractive to the practitioner of human medicine, it nevertheless constituted an important department of animal pathology.

By modern methods of investigation, many new truths concerning the function of the brain and lower centres had been developed during the last ten years, and many obscure points in cerebro-spinal disease had been cleared up. It could not, however, be said that we had used this new light so freely and effectually as we might have done in our too often fruitless search after the origin of disease, nor had we taken due advantage of the teachings of physiology in its application to the therapeutics of surgery.

In looking round for a subject upon which to address them, he had failed to find one upon which he was able to say much that was new; but in the

subject of epilepsy he thought there were many useful and important truths which might be repeated and emphasised with advantage.

By some pathologists, epilepsy had been included in a small group of affections known as "paroxysmal neuroses." He did not, however, intend to restrict the term epilepsy to that form of malady which was at once recurrent and idiopathic, but would include in it all those non-febrile convulsive seizures in which sudden loss of consciousness was identified with tonic or clonic spasm of brief duration.

He saw no practical advantage in applying the term "epileptiform" to the clinical phenomena of epilepsy, because they are secondary and symptomatic.

Epilepsy presented itself from time to time in all varieties of our domesticated creatures, and at all periods of life, but more especially during infancy and old age. Dogs appeared to be especially liable to it, and great losses were sometimes experienced in our lamb-flocks and pig-herds. In our horses, it frequently presented itself in what is generally spoken of as "megrims," and the "fits" of young cattle were for the most part epileptic. Although mostly sporadic, it occasionally prevailed in our kennels as an endemic and idiopathic affection, attacking many and sometimes all the members of a pack. In this form Professor Axe had known it to continue for weeks and months.

Referring to the causes of the disease, the Professor pointed out that while in some instances, as those last referred to, they were essentially idiopathic, in the large majority of cases in the lower animals epilepsy arose from some central or peripheral nervous irritation or organic lesion. Hæmal changes or blood contamination might also be regarded as a factor in its causation.

After particularising the causes under these several heads, the symptoms of the disease in its various degrees and forms were fully described, and the lecturer concluded by discussing the measures of treatment to be adopted in the course of an attack and the best means of preventing recurrence.

At the dinner which followed the meeting, after the usual loyal toasts, Professor Axe in a felicitous speech proposed the health of the President, Mr. Penhale, and in doing so took the opportunity of congratulating that gentlemen upon his recent accession to the civic bench as Mayor of Barnstaple. The toast was received with acclamation, and the President in reply dwelt emphatically upon the usefulness of this and kindred associations, not only to the profession, but to the public generally.

W. H. Bloye, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

A meeting of this Society was held on November 11, in the London Hotel, St. Andrew Square, Edinburgh. Mr. C. Cunningham, presiding in the absence, through illness, of Mr. James Clark, President. After the minutes of last meeting had been read by the Secretary (Mr. Peter Moir), and had been confirmed, ten new members were elected as follows:—George Cowe, Esq., of Balhousie; A. Hutcheson, Esq., Dundee; Veterinary Surgeons A. McArthur, Perth; A. McGregor, Crieff; M. Inglis, Forfar; Jas. Anderson, Forfar; Jas. Peddie, Perth; Robert McNair, Blairgowrie; James Keay, St. Martins; J. Burnett, Maybale.

Election of Office-bearers.

The next business taken up was the election of office-bearers for the ensuing session, and on the motion of Principal Williams, Edinburgh, all the present office-bearers were re-elected.

Mr. RUTHERFORD, Edinburgh, said that since they had last met they had lost a member of the Society, and a man very highly respected in the profession in the West of Scotland. He referred to Mr. McDougal, who had died suddenly about five or six weeks ago. He thought it would only be an act of courtesy on their part were they, as a Society, to move a resolution of condolence with his widow. This was agreed to.

The SECRETARY tabled a motion to the effect that life membership should be introduced among the Society's rules, and it was agreed to discuss the matter at next meeting.

Mr. RUTHERFORD referred to the annual subscription, and said that when he was Treasurer of the Society, he had felt that the annual subscription of 5s. was too small, and was barely sufficient to pay their way. They could not take part in any demonstration, and that was not a position for such a Society as theirs to be in. He proposed that the amount of the subscription should be increased, and remarked that it was quite as easy to collect half-a-guinea or 7s. 6d. as it was to get the present subscription. Mr. MOIR intimated that the Society had very little funds at present; but ultimately the matter was left over till the Annual Meeting.

The CHAIRMAN then exhibited some parts of the intestines of swine affected with swine fever. They were preserved in corrosive sublimate solution, which was a better mode, in his opinion, than preserving them in methylated spirits. He said that in this district, within the radius of a mile, there had been eleven outbreaks of swine fever, by which 370 pigs had been affected. He mentioned that he himself had killed about 250 pigs within the last month, and he had never seen swine fever so bad or of a more deadly nature than it had been within the last week. He exhibited some parts of the intestines with necrosed spots, and thought that it was a matter that required discussing. Another thing that had not been discussed in this Society was the "open joint," and he thought it would make a very good subject.

The Proposed New Charter.

Mr. RUTHERFORD, Edinburgh, then opened a discussion on the proposed New Veterinary Charter. He said it was well within their knowledge that within the last 18 months, or two years, a very considerable hue and cry had arisen in the profession as to the necessity for a new charter. In this charter, which was to be sent to the Privy Council, there were three principal items—the restoration of the rights of Members to hold office on the Council; the abolition of the dual appointment; and the election of Vice-Presidents by the Council out of members of the Council. He could not say that he agreed with these three clauses, but as it was rather different from what was asked, and as it was very probable that the great body of the profession would not be satisfied with it, he took this opportunity of bringing before their notice the present state of affairs. According to the draft, every member of the profession was to have his rights restored as far as acting on the Council, and another matter was that a vice-president could be elected by the Council out of the members of the Council. These were important matters, and things which they had asked for and succeeded in obtaining in this charter. It had been hoped that the position of Examiner might have been left to ordinary Members, not Fellows. He was just now speaking as a member of the profession, and he was bound to say that this charter as it now stood, would not long give that satisfaction to the profession which it was supposed to do. He did not think that Members of the profession would be satisfied with being shut off from becoming examiners, and by this clause in the charter, as it now stood, Members who were not Fellows were debarred from being veterinary Examiners. He thought he had the greatest respect for the

fellowship diploma, but there are plenty of men quite as capable of acting as Examiners as the Fellows were. The Members deserved as much respect as the Fellows. This charter as it now stood, contained the drawing of a most abominable distinction, which was a most invidious one, would give great offence to the profession and would not be at all satisfactory. He thought it would be wise of this Society, at that meeting or at another meeting, to express its opinion fully, plainly and boldly; because there would be no use of going to the journals and the veterinary papers, on the matter a year or two afterwards, and saying—"we didn't know about it." They did not know about it, and they should not lose their present opportunity. With regard to the other matter of the abolishing of the dual appointment he thought it was a great mistake indeed and a mistake in this way, that it was so utterly opposed to the very liberal programme which was originally intended. It struck at many good members, and implied something about the Council which he hoped did not exist, and which the profession had always in their power to amend if it did exist. A most important matter was the representation of Scotland on the Council, and he hoped that members of the profession in Scotland would speak for themselves and see that there was a more satisfactory representation on the Council if Scotland demanded it. In England there were 1,715 members, in Wales 63, in Scotland 444, and in Ireland there were 221 members. England had a solid majority of 31 members to every one which Scotland had representing her on the Council. He then went on to criticise some remarks in a leading article in that week's *Record*, and said that the whole of the electoral votes from Scotland could not put a man in unless they plumped for him and voted for nobody else. That was the present state of matters. It was not right that representatives of the colleges should sit on the Council as representing the general interest of Scotland. With all respect to his friend, Principal Williams, he would say that they were not there to represent Scotland, but to look after and represent the educational aspect of the profession. No doubt they took a great interest in the profession, but they were there only representing the rights of their students, and had no right to be there as representing the ordinary profession in Scotland. He concluded by proposing that Scotland have a better representation on the Council.

Principal WILLIAMS took notice of Mr. Rutherford's remark, that the representatives of the Colleges did not represent the working body of the profession and only looked after educational matters. No doubt that was their true function, but his experience of the Council had been that the less a man knew of educational matters the more active a part he took in it. (Laughter.) He was opposed to the abolition of dual appointments and could not for the life of him see any objection to dual appointments. He instanced the Edinburgh Town Council as a case in point, where men were elected to the Council and were then made into Provost or Bailie. Now these men were elected from within the Council, and why should they differ? Then with regard to the abolition of the claims of the Fellows only to be members of the Council, he said that many years ago he fought for that, and had always been of opinion that when a man became a member of the profession he had a right to see the honours of that profession. It was the aspiration of every member of the profession to be selected by his Fellows to represent them in the Parliament of the profession. With regard to the examinerships he thought that if a man devoted his time to the interests of the profession, travelling from North to South, that that man was more entitled to the honour of being an examiner than an ordinary member of the profession who spent no money for the benefit of the profession. He thought that strong views should go forth from the meeting on that point. They should not ask too much, and he feared very much that the opposition would be too strong for them. He would give his

support to any motion for the better representation of Scotland on the Council. It certainly deserved it, as it had done a great deal for the profession. He saw a difficulty in the matter, but he thought there was no hurry and that it should be left over till the annual meeting, when they could consider the questions clearly and lay the result of the discussion before the Council.

In reply to the Chairman, Principal WILLIAMS said the difficulty he saw was in bringing the matter forward, not in working it out.

Mr. RUTHERFORD said they seemed to be taking alarm when they gave them a leading article on it.

Mr. SPREULL, Dundee, in the course of a few remarks, advocated that the examining power should be free to anybody.

Mr. CAMERON, Berwick-on-Tweed, called attention to a matter in connection with the voting papers which required reformation. He pointed out that the voting papers were sent out so late that there was barely time to return them in time, far less giving one time to know what selection to make. In the meantime he saw no reason why their Secretary should not combine with the secretaries of other associations in Scotland so as to make a united effort and have a poll upon the whole question. He thought they should combine themselves and make their voice not only heard but felt.

Mr. RUTHERFORD thought they should have a large meeting of the profession; there was no use them working single handed. At their Annual Meeting they could have a conference with the other Societies and the West of Scotland gentleman. The Border Counties had said they would be very happy to work with their Society.

The matter then dropped, it being understood that the subject would be brought before the Annual Meeting of the Society. A paper on

ANIMAL PARASITES,

was read by Professor DE JONG, as follows:—

In this paper I intend to confine myself to some of the principal animal parasites of the skin of our domesticated animals. The skin, more than any other tissue or organ, is liable to the attacks of parasites, on account of its peripheral situation and its contact with the external world.

Parasitic diseases of the skin are due to organisms from both the vegetable and the animal kingdoms; but it is to the latter that I wish to draw your attention to-day. These are known as *dermatozoa*, in contradistinction to *dermatophyta*, the term applied to those derived from the vegetable kingdom. The *dermatozoa* belong principally to that branch of the animal kingdom termed *arthropoda*, which contains two great classes, viz., *insecta* and *arachnoida;* the main differences between them being, that insects are provided with three pairs of legs, and have their body distinctly divided into head, thorax, and abdomen; the head carries a pair of antennæ, and the thorax the *three* pairs of legs and usually two pairs of wings. In arachnoids there is no such division of the body, and the adults have *four* pairs of legs but never have wings.

The class *insecta* furnishes us with a number of parasites which affect the skin. Those which deserve our first notice are the *diptera* or two-winged insects, fleas and lice. The *diptera* do not, in their adult stage, take up their residence in the skin, but they pay occasional visits to the animal for the purpose of sucking its blood or depositing their eggs on or in the skin. One result of this is, that during the prevalence of a contagious disease it is propagated by inoculation of the virus in this manner from a diseased to a healthy animal.

You are all well aware of the alarming symptoms sometimes caused by these flies, for example, when a herd of cattle are attacked by the gad-fly they

rush furiously up and down the pastures, and it is said the mere buzzing of the insects is sufficient to render yoked animals quite unmanageable (Williams). The larvæ of some kinds of diptera are even more dangerous than the adults, and more truly parasitic as they take up their residence in certain tissues. Perhaps the principal of those which have for their habitat the skin are the larvæ of the so-called oestrides or bot-flies. The well-known "warble" is a tumour produced by a dipterous insect, the oestrius bovis, in its larval stage. When the larvæ have obtained their full development, they escape from the tumours and fall to the earth, where they shelter themselves until they assume the chrysalis state, and finally become the adult flies (imago); and so the life-history goes on.

The gad-fly which attacks the horse is called the *œstrus equi;* it acquires its larval condition within the stomach of the horse, forming the so-called "bots."

The class epizoa includes the various forms of fleas and lice. Fleas are parasitic to mammals and to birds, and live on the blood which they suck. The hosts which they most commonly favour are the dog, cat, pigeon, and farm-yard fowl. The female flea lays about a score of eggs in any convenient place, between cracks of boards, etc. These eggs are hatched in about six days in warm weather and from nine to twelve in cold weather, and develop whitish worm-like larvæ, composed of about thirteen segments. Towards the eleventh day these spin a cocoon, change their skin, and finally proceed through the chrysalis stage to that of the perfect insect. The species of flea which lives on man is named *pulix irritans* and it is often conveyed to dogs and cats. That which lives on dogs receives the name of *pulix serraticeps* being also, but less frequently, found on cats.

Pediculi—Lice are small wingless insects varying in colour, sometimes white or grey, sometimes brown or red. They are provided with mouths, in some varieties for biting, and in others for puncturing the skin. The eggs commonly called "nits," are pear-shaped bodies, which adhere to the hairs by a sticky material, and which have at one extremity a lid (operculum) through which the young emerge. The young have the same conformation as the adults, and therefore, unlike flies, do not pass through a series of metamorphoses. The females are usually much larger than the males, and more numerous. The term "phthiriasis," is employed to express any disease of the skin due to the presence of the different varieties of lice. Two varieties of the lice attack the domesticated animals, viz., *trichodectes* and *hæmatopinus*, in addition to which there is the so-called sheep tick, the *melophagus ovinus*. The *trichodectes* are characterised by the broad head, furnished with mandibles, by which they bite; whereas, the *hæmatopinus* has a long pointed head and a proboscis, for puncturing the skin and sucking the blood. Thus the injuries effected by species of trichodectes are not as decided as that caused by those of hæmatopinus, the germs to which the true lice belong. Horses are infested with one species of hæmatopinus, and two of trichodectes, viz., *H. macrocephalus*, *T. pilosus*, and *T. parumpilosus*. Cattle with two species of hæmatopinus and one of trichodectes, viz., *H. Eurysternus*, *H. temicrostris*, and *T. scabaris*; sheep with only one variety, the *T. spherocephalus* or *T. ovis*, in addition to which there is the so-called sheep tick, kid or fag, the melophagus ovinus.

Phthriasis in the sheep has been mistaken for mange or scab, and therefore I may point out to you one or two of the main differences by which the louse can easily be distinguished from the acarus producing scab, the *Dermatodictes ovis*. In the first place, lice belong to the insecta, and therefore, are provided with only *three* pairs of legs, whereas, the mange-mites (acari), belong to the arachnida, and are provided with *four* pairs of legs. That difference alone would enable anybody who took the trouble to examine the

parasite under a microscope or an ordinary magnifying glass, to identify it, and doubtless in many cases, by so doing to save a deal of annoyance and expense. Another great difference is that in insects, the body is distinctly divided into the head, thorax and abdomen, whereas, in acari, the body is not so divided, but consists of a common mass, surmounted by a mouth adapted for cutting or sucking, according to the habits of the animal. The sheep-louse is quite small, about one-twenty-fifth of an inch in length, the female being slightly longer and larger. It is characterised by its reddish head, and the pale transverse bands which cross the abdomen. The life-history is the same as already described for lice in general, the eggs being cemented to wool fibres.

One of the best known of all the external parasites of sheep is the so-called sheep tick, *melophagus ovinus*. It is not a true tick as it has only three pairs of legs, whereas the true ticks are more closely related to spiders, and have *four* pairs of legs in their adult state, The "kid," as it is often called, is a wingless fly, the adults being less than a quarter-of-an-inch long, and having a short, flattened, bristly, leathery body. Their head is provided with a proboscis by which they perforate the skin and suck the blood. The life-history of the family of flies to which this parasite belongs is rather peculiar, and, therefore, I will take the liberty of describing it. The females bring forth their young as *puparia*. These are laid as glistening seed-like eggs and contain an imperfectly developed larva within them. Some authorities say that each female produces only one or two puparia; whilst others say they can lay about eight or nine during their life-time. The insect emerges with adult characters from the pupæ cases through an opening at one end of the case made by a round lid splitting off and then wanders into the wool.

The pig is infested with one variety of lice, viz., the *hæmatopinus urins or suis*.

The dog is affected with a variety of *hæmatopinus (H. piliferus)* and also with one of *trichodectes (T. latus)*. The latter is of great importance as it harbours the cystic stage *(cysticercus canis)* of a common tape worm of the dog. *Tænia cucumerina*. In the cat is found only a single variety of louse, *T. subrostratus*.

The next great class of parasites which infest the skin are included in the *arachnoida*—the chief characters of which I have already described—and to a sub-order termed *acari*. The *acari*, or so-called mites, may be divided into two kinds; firstly, those whose presence does not cause any particular disease, merely using their host as a means of conveyance or living on the epidermal *débris* and the natural excretions of the skin, or sucking the blood of the animal which they infest; and, secondly, those which excite the peculiar disease known as "itch" in man, or mange in the lower animals, and it is to this latter class that the term mange-mites strictly applies.

The principal family of acari which does not cause mange is the tick family, ixodidæ, whereas, the two mange-producing families are the sarcoptidæ, the true mange mites, and the demodicidæ the fobbiche mites. The family ixodidæ contains parasites commonly called ixodes, ticks, or wood lice which are only temporary parasites. They are born away from their host and attach themselves to passing animals, sometimes only for a means of conveyance and at other times to suck the blood. They are provided with an armed proboscis by which they bore into the skin and suck the blood of their host. When the female ticks become sufficiently engorged with blood they fall to the ground and lay their eggs. The six-legged larvæ which emerge from the eggs are very small and become transformed into "nymphes." These are distinguished from the larvæ by their greater size and having the fourth pair of legs developed, and from the adults by the absence of sexual

organs. They fix themselves in the skin of their host and finally fall to the ground, when they develop their sexual organs. The males meet the females either on the ground or on the animal, and so the life history goes on. All animals are liable to be attacked by ticks. The commonest variety met with in dogs, sheep, cattle, and horses is the *ixodes ricenus*, so called from its resemblance to a castor oil seed. Another variety *ixodes redvius* attacks principally sheep and cattle. The disease known as Louping-Ill is due to the introduction of a vegetable organism within the system of sheep by means of ticks (Williams).

The next family of acari is the sarcoptidæ or true mange-producing mites. The mature acari have four pairs of legs which spring in pairs from the anterior and posterior parts of the body, whereas the young have only three pairs of legs. The legs terminate in long hairs capped with minute vesicles, which enable the insect to cling to the surface over which it moves. The eggs of the mature acarus are oval in shape and are hatched in about eight or ten days. The six-legged mites thus developed after several changes of skin, acquire the fourth pair of legs and are then sexually mature. According to Gerlach this condition is reached in fifteen days, and to illustrate the rapid increase of acari, he computed that in three months a single female would produce 1,500,000 progeny. He estimated that each adult female laid fifteen eggs, of which ten were females, and that the eggs became adults in fifteen days. The following is a tabular form showing the result:

					Females.	Males.
First generation after	15	days	produces		10	5
Second " "	30	"	"		100	50
Third " "	45	"	"		1,000	500
Fourth " "	60	"	"		10,000	5,000
Fifth " "	75	"	"		100,000	50,000
Sixth " "	90	"	"		1,000,000	500,000

Mange producing acari are divided into three genera—sarcoptes, symbiotes, or chorioptes, and psoroptes, or dermatodectes. *Sarcoptes*, literally flesh cutter, cut into the skin, and the females burrow under the skin, and make long galleries, at the ends of which they deposit their eggs.

Their body is round or oval, and the legs are short, thick, and conical; the two posterior pairs are completely, or almost completely hidden when the dorsal surface of the mite is exposed—the situation of the limbs being indicated only by the protrusion of a pair of long-pointed hairs. Exactly opposite to this is the case in the symbiotes and psoroptes, the hind legs being enormously long.

The *Psoroptes* have an oval body, the legs are thick and quite visible outside the margin of the body; their suckers are borne by a long, three jointed pedicle, and the head is characteristic, being long and pointed.

The *Symbiotes* have an oval body; the legs are thick and quite visible outside the margin of the body; their suckers are borne by a simple, very short pedicle; and the head is more obtuse than in psoroptes.

Species of each of these genera is found affecting the horse—viz.: Sarcoptic mange due to the *sarcoptes scatici equi*. This form of mange is not at all common, but it existed a few years ago in the Shetland Islands, where it is now under the Contagious Diseases (Animals) Act. Psoroptic mange, due to the *psoroptes equi*, is the commonest form of mange affecting the horse. The parasites are generally larger than sarcoptes—their head is long and pointed, and their legs much longer, excepting the fourth pair in the male, which are merely rudimentary organs. Unlike the sarcoptes, they do not burrow or make galleries, but cling to the hair and wander over the skin, feeding on the scales and debris, and occasionally sucking minute quantities of blood. Symbiotic mange due to the *symbiotis equi* is confined to the legs, especially

the hind ones. Like the psoroptis, it lives on the surface—on the hairs and among the scabs.

Mange in Cattle.—Sarcoptic mange may affect cattle, but is indeed very rare. The ordinary mange is due to the *dermatodictes bovis;* symbiotic mange, due to the *symbiotis bovis,* is confined in cattle to the root of the tail. Sheep are affected with the three varieties of mange. Sarcoptic, due to the *sarcoptes scabici ovis,* is usually confined to the head. The symbiotic mange, due to *symbiotis ovis,* is of rare occurrence, and has for its seat the feet and legs. Ordinary mange in sheep, known as scab, is due to the dermatodictes ovis, and is under the Contagious Diseases (Animals) Act, which provides that it is unlawful to move by land or water any sheep affected with the disease or suspected of being so affected. And, moreover, every person having in his possession a diseased sheep is bound to have it treated with some dressing used for the cure of scab. The pig only presents a single species of mange, the sarcoptic form due to the *sarcoptes scabics suis.* Three kinds of mange are met with in the dog—scarcoptic, symbiotic, affecting the ears, and demodictic due to an acarus belonging to the family of follicle mites.

This family *Dimodicictæ* contains one genus, demodix, and one species *dem. folliculorum.* These acari live in the hair follicles and sebaceous glands of several species of mammals. The parasite is oval in shape, and has four pairs of legs. The life-history is the same as that of the other acari which I have described. First—the eggs, and from these the young six-legged mites are hatched, and after a change of skin the four pair are developed. They are microscopic objects—the female does not exceed 400 micro-millimetres in length, and the breadth varies between 40 and 55. In man the dimodix is found in the follicles of the face, but it does not seem to cause any inconvenience. Dogs, cats, and pigs, are also affected with demodix, which is termed respectively—

D. folliculorum	.. ..	var. canis.
" "	.. ..	var. cati.
" "	.. ..	var. suis.

In the pig the parasites cause a pustular affection. Dogs seem to suffer more than any other animal from the disease.

In conclusion, gentlemen, I must thank you for your kind attention, and hope that we may be benefited by the discussion which will follow.

At the conclusion of the paper, Professor De Jong received a vote of thanks, discussion being deferred until next meeting. PETER MOIR, *Hon. Sec.*

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

THE Quarterly Meeting of this Association was held in the Medical Institute, Hope Street, Liverpool, on 16th December, Mr. Arthur Leather, F.R.C.V.S., President of the Association, in the chair. There was a large attendance of members. Mr. Laithwood, of Congleton, was nominated as a member of the Association, and Messrs. J. M'Kinna, Huddersfield; H. D. Chorlton, Manchester, and A. Breakell, Garstang, were elected to membership.

Messrs. LOCKE and TAYLOR reported on the question of obtaining a better meeting-place at Manchester, but it was ultimately resolved to remain for the present at the old place of meeting. Mr. S. Locke was elected a life governor of the benevolent branch of the National Veterinary Benevolent and Defence Association, in the room of Mr. Woods, deceased.

Mr. W. A. TAYLOR, in proposing that Mr. W. Woods, of Wigan, be elected President for the ensuing year, said that that gentleman was one who would do credit to the Association. Mr. Whittle seconded this, and it was unanimously carried. Messrs. Morgan (Liverpool) and Thompson (Sheffield) were chosen as Vice-Presidents, Mr. Wolstenholme as Secretary, and Mr. Hopkin

as Treasurer for the coming twelve months. Messrs. Taylor and Locke were appointed Auditors.

Mr. LEATHER, in introducing Professor M'Fadyean, said it was the first time he had lent them his presence either as a lecturer or a visitor.

Pleuro-Pneumonia.

Professor M'FADYEAN then read the following paper on "The Lesions of Contagious Pleuro-Pneumonia":—

At the present time there is only one form of pneumonia occurring in cattle of which the Contagious Diseases (Animals) Act takes cognisance, but it is well-known that both pleurisy and pneumonia may be set up in animals of the bovine species by other causes than the contagium of the disease termed contagious pleuro-pneumonia. When the clinical history of any given case is known, there may be no difficulty in determining whether that case is one of contagious pleuro-pneumonia, but in the discharge of his duties under the Contagious Diseases (Animals) Act, the veterinary surgeon has in many cases to decide whether the pneumonic lesions found after slaughter in the lungs of an animal whose clinical history is unknown, are those of the contagious disease—in other words, he has often to base his diagnosis solely on the anatomical characters of the lesions. To saddle veterinary inspectors with this duty is to assume that the lung lesions in contagious pleuro-pneumonia are absolutely pathognomonic—that there is no other known disease in which similar or indistinguishable alteration of lung structure are found. I propose to discuss whether that assumption in the present state of our knowledge is well founded. And in the first place I must crave indulgence while I describe the morbid anatomy of an ordinary case of contagious pleuro-pneumonia.

At the outset it is to be noted that in the great majority of cases there is, as the name expresses, a combination of pleurisy and pneumonia, but the association is by no means constant. There is abundant evidence to show that the primary lesion is situated in the lung substance, and that the implication of the pleura is a secondary process. The hypothetical germ of the disease appears to enter the lung with the inspired air, and, having penetrated into the lung tissue, it sets up in the area in which it multiplies changes that lead to the peculiar form of consolidation presently to be described. Until this consolidation has at some point advanced up to the surface of the lung, the pleura remains healthy; but whenever the lesion, in the process of extension, reaches the superficial lobules at any part, the overlying pleura immediately becomes affected. Passing over for a moment the characters of this pleurisy, let us examine the alterations usually discovered in the lung substance.

The extent of lung affected is of course very variable; the lesions may involve the whole of one lung or the greater part of both, and the only limit in the upward direction is that caused by the fact that a certain amount of healthy lung tissue is necessary for the continuance of life. Theoretically we ought to expect to find all gradations of extent, down to the very smallest lesions, for in every case the disease must start from a point of microscopic dimensions. Nevertheless, even under the operation of the Slaughter Order, very minute lesions are seldom detected. This may be due to the progress of the lesion being very slow during the first days or weeks of the period of incubation, and more rapid when once it is fairly started, but probably it is in part explainable by the fact that until the lesion has reached a certain extent and invaded a certain number of lobules, it does not acquire those features which we regard as characteristic of the disease. In other words, we might find some thickening of a septum, some effusion into a single lobule, or a spot of disease in a bronchus, but we do not know any character that would absolutely stamp any one of these as being caused by the virus of pleuro-

pneumonia. The very onset of the disease will not be recognisable until we discover the casual organism, and learn how to demonstrate its presence in the tissues.

When the consolidated part of a pleuro-pneumonic lesion is incised in an ordinary case of the disease, the cut surface presents a marbled appearance. This marbling is determined in the first place by the intersection of prominent pale yellow lines or bands, which correspond to the "veins" in a slab of marble. These, as everyone knows, are sections of the altered interlobular septa. Regarded from a little distance, the septa may appear homogeneous, but when closely inspected they show a variable structure. In some portions of the consolidated area the septa may be described as composed of a meshwork of delicate connective-tissue filaments saturated with a straw-coloured liquid, which exudes from them as soon as they are cut across. This liquid—the so-called "lymph" of inoculators—is in reality contained in the greatly distended lymphatic spaces and vessels of the septa: and in the latter, vessels which normally are quite invisible to the naked eye may have acquired the diameter of a crow quill. When the liquid escapes from the lymphatics it usually soon forms a soft coagulum. The apparent breadth of the septa varies greatly, but this is partly due to many of them being cut very obliquely, while others are cut straight across. Towards the margin of the consolidated area the thickening of the interlobular connective tissue shades off gradually, but it is usually traceable into the non-hepatised lung tissue.

The so-called lymph is not present in the liquid state in all the thickened septa. Some of the latter are beset, not with fluid lymph, but with coagulated fibrin, and these acquire in consequence a greater firmness and friability than are possessed by the septa in which the lymph is in the liquid state. Moreover, in some parts the septa may be still firmer and actually fibrous in appearance.

Turning in the next place to the lung parenchyma, we find that this presents alterations that form an essential part of the picture. The sections of pulmonary lobules cut in various directions appear as coloured islands surrounded by the pale septa, and if the consolidation is of any considerable extent these islands are not uniform in colour. The shades of colour commonly present are buff or yellow, light red or salmon-coloured, deeper red or flesh (muscle) coloured, and deep dark red like extravasated blood. The density of the parenchyma, like that of the interlobular tissue, is variable, and there is generally a gradual transition from hepatised to normal lung at the periphery of the solidified portions.

In the more solid central portions of the lesion the arteries and veins are often thrombotic, and the bronchi in the same area may be plugged with coagula of various sorts, and show obvious thickening of their walls and contraction of their lumen.

What, it may now be asked, are the microscopic lesions that underlie these departures from the naked-eye appearance of a normal lung?

(1.) The interlobular septa. At the periphery of the affected part, where the first stage in the broadening of the interlobular septa is found, the rich network of lymphatic channels is seen to be distended with a fibrinous coagulum which is in general very poor in cells. The fibrin appears as a cloud of delicate threads and finely granular matter. For the most part the fibrin here seen is of *post-mortem* formation, the solid coagulum having been formed from the fluid lymph that escapes from the cut surface of the fresh lung. Although the fibrinous lymph within the channels is, as already mentioned, poor in leucocytes, these are often numerous at the very margin of the interlobular septum, and I am inclined to think that such a small-celled infiltration is always prominent at the outset of the lesion in the inter-lobular connective tissue. The broader septa in the more solid part of the hepatised

area also owe their increased thickness and firmness mainly to the coagulation of a fibrinous material in their enormously distended lymph channels. The granular character, and staining reactions may indicate that this fibrin is already in process of degeneration, and frequently it is being invaded from the margin of the septum by leucocytes and young fibro-blast cells. In the still firmer septa of old lesions the fibrin of the earlier stage has been largely removed, and its place has been taken by young connective tissue. All stages in the formation of this—from the round fibro-blast cells to the fibrillated tissue—may be met with in one field of the microscope.

(2.) Parenchyma or lobular tissue. When sections from the peripheral part of a pleuro-pneumonic lesion are examined microscopically, the lobules may be found to be almost normal although the connective tissue surrounding them already has its thickness notably increased through the above-described lymphatic distention; and this statement applies not only to the air vesicles and infundibula but also to the interlobular bronchi. But when the connective tissue capsule of the lobule becomes greatly thickened the lobule must obviously suffer. Some of the fleshy yellow or pink lobules have been rendered airless (1) through the escape into their most peripheral air vesicles of a fibrinous material identical with that in the lymph spaces of the interlobular connective tissue, and (2) through compression of their more central air vesicles by this same fibrinous exudate in the peripheral part of the lobule and in the connective tissue around the lobule. If the distribution of the fibrinous exudate is not uniform throughout a lobule, then it is most abundant in the peripheral air-cells. These are frequently filled with small fibrinous clots identical with the coagulum in the adjacent interlobular tissue, while the central parts of the lobules, including the bronchioles, are absolutely normal save that they are slightly compressed. A most notable feature of the lesion in the lobules is that it is not at any time associated with marked distension of the pulmonary capillaries, such as is constant in the early stage of other forms of pneumonia. The fibrinous exudate in the air-cells may be of recent formation, or it may already have undergone hyaline or fatty degeneration.

But the alveolar contents are by no means always fibrinous in character. In many lobules the change is distinctly a catarrhal one, air vesicles being filled with round nucleated cells, apparently the progeny of the swollen and proliferating epithelium. This change may affect the lobular bronchi also. Sometimes the catarrhal proliferation is associated with a peculiar transformation of the alveolar epithelium, that having become distinctly columnar in character. The fact that catarrhal changes are common in contagious pleuro-pneumonia has been strongly insisted upon by several writers on the subject, notably by Dr. Gerald Yeo and Dr. Woodhead; and indeed, it must be known to everyone who has paid any attention to the minute anatomy of the lesions.

In the dark-coloured areas which mark the seat of an infarction the air-cells as well as the septa are crammed with blood, and in old lesions the walls of the air vesicles are thickened by the formation of connective tissue.

The occurrence of catarrhal changes within the lobules, and affecting the terminal bronchioles, has already been mentioned, but similar changes are not uncommon in the larger bronchi running in the connective tissue of the lung. Throughout the area of consolidation the peribronchial lymphatics are distended with fibrinous lymph, but, in addition to that, the bronchial mucous membrane may show pronounced catarrhal changes. Dr. Yeo says, "I have never examined a lung affected with pleuro-pneumonia in which there was not a well-marked and characteristic lesion of the bronchial tubes of the part most severely affected. No matter how small the focus of disease in the lung may be, or how little advanced a stage these morbid changes may have reached, there is always definite disease in the corresponding bronchus, extending some distance along the tube, but more or less localised to the diseased

neighbourhood." The passage quoted, coming as it does from an accomplished microscopist and one who has studied with great care the morbid anatomy of pleuro-pneumonia, may serve to show the folly of concluding, as some have done, that the discovery of bronchitic changes in any case of pneumonia in the ox stamps the disease as something other than contagious pleuro-pneumonia.

The minute anatomy of the vascular lesions in pleuro-pneumonia may be dismissed in a few words. The lymphatic vessels around the artery and vein share in the engorgement with fibrinous lymph. This may be followed by a small-celled infiltration of the coats of the vessels, thickening and roughening of the intima, and thrombosis with partial or complete occlusion of the lumen.

It has already been mentioned that pleurisy is an exceedingly common but not absolutely constant accompaniment of the lung consolidation. Where the affection of the pleura is recent, the free surface of the membrane is covered with a thicker or thinner layer of grayish tough lymph, and the pleural sac generally contains more or less of a turbid yellowish liquid with fibrinous coagula floating in it. In the uncomplicated disease, this exudation is neither purulent nor putrid. Where the parietal and visceral pleura are not kept apart by the exudation they become united by the layer of fibrinous lymph, and in process of time this lax union may be replaced by firm adhesion due to the formation of fibrous connective tissue.

The microscopic anatomy of the pleural lesions presents little that is special or interesting. The sub-pleural lymphatics are engorged with fibrinous lymph in the early stage of the process, and the layer of lymph coagulated on the surface of the membrane is generally rather poor in cellular elements. As soon as this layer is deposited, degenerative changes begin on it, and *pari passu* it becomes invaded from its deep aspect by leucocytes and fibro-blast cells. The solid fibrin is thus gradually removed, and young cicatricial tissue is substituted for it, and this, if time permit, may lead to the production of firm fibrous adhesions between the lung and the chest-wall.

The foregoing account of the lesions commonly found in contagious pleuro-pneumonia makes no pretensions to being complete or exhaustive. The omission of any reference to the ulterior alterations, such as necrosis, caseation, gangrene, etc., is deliberate and not an oversight, for the object has been to describe only such changes as are to be found in nearly every case of the disease, in order to be in a position to consider how far these changes, taken separately or in combination, are pathognomonic. But before taking up that question, there is one other point that demands consideration, viz., the sequence of the lesions previously described. Incidental allusion has already been made to this, in expressing the opinion that the pleural affection ought to be regarded as secondary. But taking this for granted, one may ask, what is the order in point of time of the various lesions found in the lung substance? Dr. Yeo * as the result of his investigations, came to the conclusion that the primary seat of the disease is in the bronchi, and he considers the sequence of the lesions to be as follows:—

"1. Irritation of the mucous membrane of the smaller bronchi, probably by some infective material (specific virus).
"2. Chronic ulcerative bronchitis, localised to a few minute bronchi.
"3. Occlusion of the affected air-tubes.
"4. This produces such changes in the air-cells belonging to the affected tubes that the lobular parenchyma becomes solid.
"5. As the bronchial disease progresses, the walls of the air-tubes become thickened and infiltrated with the products of chronic inflammation.

* Journal of the Royal Agricultural Society of England, vol. xiv., pt. 1.

"6. The peribronchial lymphatics are implicated by the extension of the infective process from the bronchus, and are soon filled with dense exudation.

"7. The block in the lymphatics of the broncho-vascular system impedes the flow of lymph from the corresponding territory.

"8. The tributary lymph-channels are thus mechanically engorged, and at the same time they are irritated by infective materials.

"9. The inflammation of all the coats of the air-tube gradually spreads towards the root of the lung. Thus we have a deep-seated cone of typical consolidations, traversed by numerous wide whitish lines, corresponding to the swollen interlobular connective tissue (marbling). In fact, the essential features of the disease are established."

Dr. Woodhead * arrived at somewhat different conclusions regarding the starting-point and progress of the lesions in the lung. He believes that the primary irritation is not confined to the mucous membrane of the smaller bronchi, but that it may directly or indirectly implicate the epithelium of the air vesicles, and set up catarrhal proliferation. He supposes that the virus passes from the air vesicles (and sometimes from the smaller bronchi) into the surrounding lymphatics, and that the peribronchial lymphatics are implicated by extension from the air vesicles as well as from the bronchi. The block in the lymphatics of the broncho-vascular system impedes the flow of lymph from the corresponding territory, and this is followed by the accumulation of fibrinous lymph in the air vesicles. This material finds its way into the smaller bronchi, and then to the neighbouring air vesicles, helping to set up a *catarrhal* pneumonic process by occlusion of some of the smaller bronchial tubes, and by direct irritation.

To determine the precise starting-point of the lesions of pleuro-pneumonia is, for the reason already indicated, difficult if not impossible; but there does not appear to me to be much difficulty in determining the manner in which the disease extends, and the order in which the various elements of the lung tissue become involved when once the disease has obtained a foothold, As regards this point, my own observations have led me to conclusions much more in harmony with those of Dr. Woodhead than those of Dr. Yeo.

I think it is highly probable that the initial lesion in pleuro-pneumonia is in the connective tissue at some part, and, however that may be, there is clear evidence in nearly every case of the disease that the affection spreads by way of the lymphatic vessels and spaces of the interlobular connective tissue (including the peribronchial and perivascular lymphatics), and that the implication of the bronchiai and alveolar epithelium is a purely secondary process. Evidence in support of this is met with in every case in which the consolidation is extensive, for while one never finds either croupous or catarrhal lesions in lobules surrounded by healthy connective tissue, there is no difficulty in finding lobules that are absolutely or nearly normal, although the connective tissue around them already exhibits marked distension of its lymphatic spaces. Moreover, where lobules are only partially consolidated their central part, and the intralobular bronchi are always least affected. In short, the lobular disease has a centripetal mode of extension.

The catarrhal affection of the air-cells and bronchi is, in my opinion, always as much a secondary process as the changes in the walls of the blood-vessels, and my experience is entirely at variance with that of Dr. Yeo regarding the order in which the bronchial mucous membrane becomes involved. Not only may the intralobular bronchi be found perfectly normal in lobules whose peripheral vesicles are filled with a fibrinous exudate, but even

* Journal of Comparative Pathology and Therapeutics, vol. 1.

in completely hepatised areas all the bronchi, large and small, may have their epithelium absolutely intact, even to the retention of the cilia.

Neither the nature nor the mode of extension of the lung lesions in pleuro-pneumonia is dependent upon anything special in the structure of the bovine lung, although such an opinion has been expressed by various writers on the subject. The peculiar features of the lesion are ascribable to the specific characters of the, as yet undiscovered, microbe of the disease, and no further evidence of this need be cited than that all the peculiar characters of the lung lesion are reproduced when the virus propagates in such widely different tissues as those of the mammary gland or the voluntary muscles. In all cases the primary and essential change is a distension of the lymphatic vessels and spaces of the part with fibrinous lymph that is comparatively poor in cellular elements. The lesion may be regarded as a peculiar form of inflammation, comparable to that of erysipelas, but differing from that in the slightness of the vascular disturbance, in the paucity of leucocytes in the exudation, and in the absence of all tendency to suppuration. Indeed, in great measure the lesion, when fully established, appears more of a lymphatic engorgement than an inflammation, but doubtless this engorgement is associated with a truly inflammatory process at some points in the lymphatic system of the part.

And now we arrive at the all important question, Are the before-described lung lesions pathognomonic of contagious pleuro-pneumonia, or are indistinguishable alterations sometimes produced in the lung of the ox by other forms of irritation? The following quotations may serve to show how divided opinion is on that subject.

Professor Williams, in the first edition of his work on *Veterinary Medicine*, thus describes the morbid anatomy of contagious pleuro-pneumonia:

"On opening the chest of an animal which has been slaughtered early in the disease, the visible changes are redness of the affected pleural surfaces; the substance of the lungs is red and congested; the redness and congestion being often in patches, whilst the lung tissue for some distance may be more or less healthy until another patch of more or less consolidated tissue is arrived at. The groups of consolidated lobules vary much in colour, some showing the deep redness of recent inflammation, whilst others present signs that the exudation is not only consolidated, but is undergoing a gradual metamorphosis—softening—by which it is changed into a whitish turbid fluid, which flows from the cut surface, and to some extent capable of absorption. We have thus the red and the grey hepatisation, the red denoting the early, the grey the more advanced stages of the inflammation.

"Some have supposed that the very extensive exudation into the lung structure, and its marbled appearance, are indicative of some speciality in the inflammatory process: this is not, however, the case, for it is found that an ordinary pneumonia caused by cold, induces the same anatomical condition of the pulmonary parenchyma, the peculiar appearance being due to the anatomical fact that the lungs of horned cattle contain much connective tissue, and that the air cells are separated into groups by such connective tissue. 'In the ox and sheep the subserous, as well as the interlobular tissue, is very thick, the lobules being distinctly visible. This distinctive conformation explains the speciality of inflammatory diseases of the lungs in those animals.'—(Strangeways)."

Galtier in his *Traité des Maladies Contagieuses* (1st edition, p. 510), after giving a description of the lesions which is much too long for quotation here, says: "The pulmonary lesions of pleuro-pneumonia are not veritably pathognomonic; they resemble those of ordinary pleuro-pneumonia of the ox, but it seems that in the latter the infiltration and exudation are less pronounced and less generalised."

Putz, in the corresponding German work*, regards this question as undecided and requiring further study. He quotes the following passage from Dr. Pauli: "There occurs in the ox a sporadic lung affection which, both in its external symptoms in the living animal and in its morbid anatomy, is similar to, if not the same as, contagious pleuro-pneumonia. Spinola's assertion that marbled hepatisation is exclusively the consequence of the organisation of the bovine lung, and not in itself a peculiarity of contagious pleuro-pneumonia, thus, like so many other statements by that experienced investigator, finds corroboration.

In their excellent text-book on the special pathology and therapeutics of the domesticated animals, Friedberger und Fröhner† describe a sporadic croupous pneumonia of the ox, and thus refer to its differential diagnosis: "The morbid anatomy of the two diseases is essentially different. In croupous pneumonia, on account of the acute course of the disease, the hepatised portions of lung are of the same age, colour, and character, and are thus completely similar; the interstitial system of lymphatic vessels is either not at all involved, or only in a state of œdematous infiltration, or, if the process is very advanced, saturated with a thin fibrinous exudate with occasional white blood corpuscles. Pleuro-pneumonia, on the contrary, is characterised firstly by the different age and appearance of the hepatised areas, and secondly by the prominent participation of the interlobular lymphatic apparatus. The latter is shown by the extreme inflammation of the interstitial lymphatics (lymphangoitis), with the formation of thrombi in the interior of the vessels, and marked inflammatory infiltration of the interstitial connective tissue, leading to broadening of the latter; the pleura also is, in consequence of this, almost always implicated, in the form of an exudative fibrinous pleurisy."

Dr. Salmon, veterinary adviser to the Government of the United States, recently referred to this subject at a meeting of the United States Veterinary Medical Association, and a special interest attaches to his views regarding the differential diagnosis of contagious pleuro-pneumonia. He is reported to have said‡:—"Those who have had experience with pleuro-pneumonia know how difficult it is to make a diagnosis when you have only one of these animals, and no way of tracing the history of that animal. You may find the condition of the lungs which resembles pleuro-pneumonia but which also resembles other diseases. We all know that pleuro-pneumonia produces a peculiar effect on the appearance of the affected lungs; but these peculiarities are also found in lungs which have received their irritation from other germs and sometimes by other agents, so that it can hardly be claimed to-day that these symptoms are always those of contagious pleuro-pneumonia. Of course, when you take these symptoms of pleuro-pneumonia and couple them with other characteristics which we generally see, then we begin to have very positive evidence of the diagnosis."

Many similar quotations might be culled from text-books and journals, but those given will suffice to show that in the experience of some observers lesions identical with those constantly encountered in contagious pleuro-pneumonia are occasionally found in animals whose clinical history warrants the assertion that they never were exposed to the contagion of pleuro-pneumonia, and which, although placed in favourable circumstances, did not communicate the disease to other animals. On the other hand, they show that others of equal experience have never met lesions identical with those of pleuro-pneumonia in animals whose clinical history proved that the disease was not due to contagion, or devoid of contagious properties.

* Die Seuchen und Heerde-krankheiten der unserer Hausthiere, p. 84.
† Lehrbuch der speciellen Pathologie und Therapie, 1st Edition, p. 248.
‡ Journal of Comparative Medicine and Veterinary Archives, 1892, p. 664.

The sharp conflict of opinion on this matter is probably due to two things; (1) to the not infrequent difficulty of tracing the contagion of pleuro-pneumonia, and (2) to loose notions regarding the morbid anatomy of that disease. Regarding the first of these nothing need be said, but the second point demands further consideration.

In most of the recorded cases of so-called sporadic pneumonia with lesions indistinguishable from those of the contagious malady, the authors lay special stress on the "marbled" character of the hepatised lung; but it is very important to observe that a certain form of marbling is in no way peculiar to the contagious pleuro-pneumonia,-or even to the bovine species. A marbling due to mere increased prominence of the interlobular connective tissue of the lung is admittedly met with in sporadic pneumonia of the ox, and in some cases even in the horse and pig. But an essential feature in the marbling of contagious pleuro-pneumonia is the variety of colour presented by the groundwork or pulmonary parenchyma, and I agree with those who hold that we know of no other disease in which this form of marbling is produced. Moreover, I maintain that we know of no disease save contagious pleuro-pneumonia with lesions similar, as regards their nature and mode of extension, to those described in the preceding pages of this article.

Such statements as that quoted from Dr. Salmon are too vague to require any direct refutation, and a sufficient reason has already been given for discrediting the opinion formerly expressed by Professor Williams and others, that the peculiar hepatisation of pleuro-pneumonia is due to the anatomical features of the bovine lung.

The great importance of having clear notions regarding this question has been prominently brought to light by a recent conflict of opinion regarding the nature of certain lesions discovered in the lung of an American ox slaughtered at Deptford in April last.

The veterinary officer of the Board of Agriculture, whose duty it was to inspect the lungs of this ox, discovered in them lesions which he considered to be those of contagious pleuro-pneumonia; and when the suspected organs were forwarded to head-quarters, this opinion was confirmed by Professor Brown, and Messrs. Cope and Duguid. At this stage Mr. Wray, one of the American veterinary surgeons stationed in this country to see that United States cattle are not wrongly condemned for pleuro-pneumonia, dissented from the diagnosis made by the officers of the Board of Agriculture; and, having submitted portions of the diseased lung to Professor Williams, he obtained from the latter an opinion corroborating his own. The first public intimation of this was made through the medium of an agricultural paper in the following terms: "Dr. Wray came to Edinburgh with portions of the affected lungs in order to have them examined by Principal Williams, of the New Veterinary College, and that expert had declared the disease to be broncho-pneumonia, a non-contagious disease which is quite distinct from the true pleuro contagiosa. So clear was the evidence in support of this declaration that Principal Williams expressed his readiness at any time to demonstrate to any body of veterinary practitioners the distinctive features of broncho-pneumonia detected in these affected lungs, as distinguished from the characteristic lesions of contagious pleuro."

Prior to this, portions of the lung had been submitted to Professor Walley and myself, and in each case the opinion was expressed that the lesions present were not distinguishable from those of contagious pleuro-pneumonia.

It need hardly be said that this extraordinary divergence of opinion immediately attracted much attention in agricultural as well as in veterinary circles, and everyone will admit that it was very desirable that better evidence than the mere publication of these contradictory views should be forthcoming in order to enable the profession and the public to judge where the error lay.

Professor Williams' declared readiness to submit the diseased lung to any body of veterinary practitioners bespoke complete confidence in his own opinion, and credit must be accorded to him for having conceived what was the proper method of settling the dispute. It is, however, greatly to be regretted that he has not as yet fulfilled his promise. It is true that at a meeting of the Scottish Metropolitan Veterinary Association he did exhibit in support of his opinion a micro-photograph from the lung of the Deptford ox, but the published report of the remarks made by the members at that meeting leaves no doubt that he failed to convince them that the disease was not contagious pleuro-pneumonia. Most people would think that this hesitancy on the part of the members of the Scottish Metropolitan Veterinary Medical Association to declare from the examination of a single micro-photograph that the Deptford ox had not been the subject of pleuro-pneumonia, was highly commendable: but Professor Williams appeared to have thought otherwise, for he is reported to have exclaimed that if such evidence was not deemed sufficient they had better throw microscopic examination to the winds.

So far as the profession at large was concerned, the matter thus remained as doubtful as before; and hence, with a view to satisfying themselves, and at the same time providing evidence available to the whole profession, the members of the North of England Veterinary Medical Association determined to accept Professor Williams' offer already quoted. It was accordingly arranged to devote a meeting to the discussion of the subject, and Professor Williams was invited to attend and exhibit whatever specimens he thought necessary to convince the members of that Society that the Deptford ox had been free from pleuro-pneumonia. The author of this paper was invited to attend at the same time and lay before them what might be called the opposite side of the case. This meeting was held on the 20th of last month, but Professor Williams did not attend it. His absence is in a sense regrettable, but it is doubtful whether tbe outcome of the meeting would have been different had he been present. Professors Hunter and Bowhill, both members of Professor Williams' teaching staff, did attend, and exhibited micro-photographs to prove that the lesions present in the lung of the now famous ox were those of catarrhal pneumonia, and not of contagious pleuro-pneumonia. On the other hand, I submitted to the members a mixed series of preparations—naked-eye, lantern and microscopic—made from the disputed case and from a number of British cattle killed under the Slaughter Order, while suffering from contagious pleuro-pneumonia. No one present (and this applies also to Professors Hunter and Bowhill) was able to distinguish in this mixed series of specimens those belonging to the Deptford ox: and when subsequently the preparations from this animal were specially pointed out, they were accepted by every member present as examples of contagious pleuro-pneumonia.

It will be gathered from this that Professor Williams' representatives entirely failed to convince the members of the North of England Society that one or two micro-photographs can afford more reliable evidence than a careful naked-eye examination of the diseased lung in the differential diagnosis of pleuro-pneumonia. Indeed, one might put this statement more strongly, and say, that these gentlemen furnished irresistible evidenee that they were themselves unable to distinguish pleuro-pneumonia by its microscopic characters; for both identified as catarrhal pneumonia, sections from a typical pleuro-pneumonic lesion in the lung of a cow—one of four animals simultaneously affected in a small byre in Edinburgh.

But there remains to be mentioned additional evidence of great weight in support of the opinion that the Deptford ox was the subject of pleuro-pneumonia. On the occasion of a visit to the Continent during the past summer, I personally submitted portions of the lungs of this animal to

Professors Bang (Copenhagen), Schütz (Berlin), Johne (Dresden), Csokor (Vienna), Kitt (Munich), and Lüpke (Stuttgart), and each of these distinguished pathologists without hesitation declared that the lesions present were those of contagious pleuro-pneumonia *(Lungenseuche)*.

He exhibited a mixed series of specimens illustrating his views on that subject. These specimens included (1) large sections projected on a screen by means of an oxy-hydrogen magic-lantern, (2) photographs similarly projected to illustrate the naked eye and microscopic characters of pleuro-pneumonic lesions, (3) smaller sections exhibited under the microscope, and (4) portions of lungs that had been preserved in spirit, to show the naked-eye appearances. These specimens, he informed the meeting, included some from the disputed Deptford case, and he invited any of the members to point out any specimen that in their opinion did not show the lesions of contagious pleuro-pneumonia. There was one point further to which he would like to allude. At the recent meeting of the North of England Society, Mr. Bowhill, who, after a very short apprenticeship, styled himself a bacteriologist, exhibited a specimen from the lung of the Deptford ox, showing, as he alleged, bacteria identical with those described by Professor Nocard in connection with an infectious form of broncho-pheumonia. These bacteria, Professor M'Fadyean affirmed, were common putrefactive organisms. The piece of lung before it reached Edinburgh was not fresh, and it contained not one, but several species of bacteria. None of them had a distribution indicating a casual relationship to the lesions.

The PRESIDENT having asked for remarks or questions,

Mr. SMART, port inspector at Birkenhead, asked whether it was not the case that the micro-organism of pleuro-pneumonia had been discovered.

Mr. FALKNER (Manchester) said that he for one felt convinced that the specimens Professor M'Fadyean had shown were affected with pleuro-pneumonia, and if they were not so affected it was impossible to say what else was wrong with them. He had never seen similar specimens to those shown in any other disease than pleuro-pneumonia.

Mr. REYNOLDS (Liverpool) said that he did not think that the meeting should set itself up to say what was pleuro and what was not, from what had been said that evening. He should be very chary in hazarding an opinion upon such small pieces of lung, even were they fresh. In order that anyone might form a definite opinion either on contagious pleuro-pneumonia, or ordinary bovine pneumonia, he ought to see the fresh lung, and the greater portion of it.

Mr. FALKNER said that his position was that he had never seen any outbreaks of pleuro where the appearances did not tally with the specimens shown by Professor M'Fadyean.

Mr. HOPKIN (Manchester) while thanking the Professor for his highly instructive paper, deprecated making the matter a party question, or sitting in judgment between different members of the profession when they had only heard one side. He had seen some remarks in the *Record* lately, to the effect that it was hoped the Lancashire Association would speak out, and he thought such observations very unfair.

Mr. EDWARDS expressed himself as highly interested in the lecture.

Mr. WHITTLE said he had no hesitation in saying that the specimens shown were affected with pleuro-pneumonia contagiosa.

Mr. LOCKE said it was difficult to give a decided opinion. One of the specimens certainly looked like pleuro, but another of them was doubtful, especially on the outside of the lung. It had been stated that pus was found in the bronchi of the Deptford ox, and he asked whether in that case it was not possible for both diseases to be present in the same lung.

Professor M'FADYEAN, in replying, said that he desired in the first place to remove misconception from the minds of some of the speakers. He had

never for a moment expected that that Association would pass a formal vote either one way or the other regarding the nature of the lesion present in the lung of the Deptford ox. At the same time, no matter what reservations any of them might take, he would claim that he had that evening exhibited portions of that lung along with others from known cases of contagious pleuro-pneumonia in home cattle, and that no one was able to pick out the Deptford specimens, or, when they were pointed out, indicate a point in which they differed from the others. While commending the caution displayed by Mr. Reynolds and others, he thought that the position taken up on this matter by Mr. Falkner was perfectly logical. They formed their opinions regarding the lesions of contagious pleuro-pneumonia from cases where the clinical history proved that the disease was of that nature, and when they found such lesions in animals of which they could not ascertain the clinical history, they set them down to the contagious disease. He desired to express his dissent from Mr. Hopkin's view that such questions were to be discussed as involving anything "personal." There was no personal element in the question. Even if Professor Williams had been his greatest friend, he claimed the right to go before any body or association and support his own opinion, and he declined to be gagged because another person who might have a greater reputation differed from him.

With regard to the bacillus of pleuro-pneumonia, a number of micro-organisms had been put forward at different times as the causal organism of the disease, but it was universally accepted by all accredited bacteriologists that the causal connection of any organism with pleuro-pneumonia had not yet been proved. Indeed it was one of the essential features of contagious pleuro that all the customary methods of staining failed to show organisms when the disease was not complicated with some other lesion.

As to whether an animal might have both broncho-pneumonia and contagious pleuro-pneumonia at the same time, it was impossible to say that such might not be the case, for they could not suppose that an animal affected with broncho-pneumonia was protected against contracting pleuro-pneumonia. Possibly there might have been a small lesion of broncho-pneumonia in the piece of lung examined by Professor Williams.*

Equine Tuberculosis.

Professor M'FADYEAN then proceeded with the second part of his address —"The Lesions of Equine Tuberculosis."

He said that some years ago there had come under his observation a horse's spleen that was the seat of very large tumours. These tumours were, as was customary at that time, set down by himself and others who saw the spleen as examples of lymphadenoma, but some time afterwards on proceeding to make a microscopic examination of the growths he found that he had a minute structure agreeing with that of tuberculous formations, and on staining for tubercle bacilli he found these organisms present in great abundance. Since then, through the kindness and co-operation of members of the profession in various parts of the country, he had been enabled to make observations on about 40 similar cases. As instancing that the immense majority of splenic tumours were really tuberculous, he mentioned that he had not met with more than two or three cases where they were of a different nature. The lecturer then threw on the screen photographs of tuberculous spleens, and for comparison two others with non-tuberculous growths. About one of these he said he had himself been mistaken, for he photographed it as a case of tuberculosis, but when he cut into the tumours they were found to be melanotic.

*We are requested to state that Professor Williams will refer to this subject at the meeting of the Scottish Metropolitan Society, which will be held on the 17th inst.—*Ed.* V.J.

In the other non-tuberculous spleen shown the growths were sarcomatous. At this point he said that he was unable to show them what was probably in every case the primary lesion in these cases, viz., tuberculous disease in connection with the bowels, and he hoped that if in future any of the members present had an opportunity to make a *post-mortem* in a case of so-called lymphadenoma he would search carefully for bowel lesions. Sections showing typical miliary tuberculosis of the lung were then exhibited from various cases. In the horse the alimentary canal was nearly always the port of infection, a circumstance which raised some speculation as to the source of the infection. The disease might for a long time remain localised to the abdominal organs, but in many cases it became general, and then the lung became crammed with miliary tubercles, each of which marked the point where one or more tubercle bacilli had been arrested in a pulmonary capillary.

Sometimes the lung lesions were of a different nature, and specimens were exhibited showing tuberculous broncho-pneumonia in the horse.

The other specimens exhibited were photographs showing the minute structure of tuberculous lesions in the horse, and the distribution of the tubercle bacilli in them. For these and also the photographs of pleuro-pneumonic lesions previously exhibited, Professor M'Fadyean said he was indebted to the skill of Mr. P. D. Coghill of the London Veterinary College. In passing, he said that, as they would observe, Professor Williams had undoubtedly given a wrong account of the giant cells of tuberculosis, which were seldom or never branched.

The last photograph exhibited was one of a cervical vertebra of a tuberculous horse. This was studded with asperities indicating that there had been some periostitis, but unfortunately he could not say whether that had been of a tuberculous nature. The case had occurred in the practice of Mr. M'Connell, of Wigtown, and the symptoms prior to death had pointed to the existence of some such lesion. All the neck vertebræ had been similarly affected on both sides.

The PRESIDENT said he was only re-echoing the sentiments of everyone present in thanking Professor M'Fadyean for coming so long a distance to give such a practical lecture and intellectual treat. It was about the first time that such a demonstration had taken place at any meeting of that Association, and it was to be commended as it gave those who who left college some time, and were acting as practitioners, a chance of seeing what was going on.

Mr. W. A. TAYLOR gave particular instances of tubercular pneumonia found in horses.

Mr. FALKNER said he had been making observations in this direction for some time. A few years ago it was said that they had no such thing as equine tuberculosis, but as he had seen one or two cases which made him doubt that, he had kept his eye open and had lately encountered several instances. As to the mode of infection, it was a matter for very careful watching. He had a case a short time ago of a 3-year-old. That animal had been supposed to be all right up to 2 years of age, and after a year's grazing it commenced to fall away. In other cases, animals were not suspected until 10 or 12 years old, and had lived for 5 or 6 years in the town. It was difficult to know how these became infected, and he hoped that as practitioners the members would take particular notice of matters which might throw light on that point.

Mr. WOLSTENHOLME said, with reference to the first paper, that he had paid some attention to the microscopic lesions of the various forms of pneumonia in the human subject, and he should certainly accept the evidence placed upon the screen and the slides exhibited as proving that the lesions were not examples of bronchial inflammation. He had frequently had cases of brain affection in horses, and on taking some of the tumours to Owen's College they were found to be tuberculous. It was a great stimulus to those who were

hard at work in general practice to have a Professor come down now and then to lead their minds from the drudgery of their daily work.

Mr. W. A. TAYLOR, in proposing a vote of thanks to the lecturer, said that they had had quite an intellectual treat, and he hoped that some day they would be able to welcome the Professor in Manchestor.

Mr. HOPKIN seconded the motion, which was unanimously carried.

Professor M'FADYEAN, in thanking the meeting, said that if anything he had said had proved instructive to members of the society he was more than repaid, and would be glad to come there again.

A vote of thanks to the retiring President brought the meeting to a conclusion.

THE FORMATION OF A VETERINARY MEDICAL ASSOCIATION FOR SOUTH WALES AND MONMOUTHSHIRE.

IMPRESSED with the fact that no opportunity occurred in South Wales or Monmouthshire for the meeting together of the Veterinary surgeons practising in the district, a joint circular was issued by Messrs. Storrar, of Abergavenny, and Stewart, of Cardiff, to the members of the profession resident in the district, asking their opinion as to the advisability of instituting a Veterinary Medical Association, and calling a meeting of those interested.

At the meeting, which was held at the Park Hotel, Cardiff, on January 15th, there were present: Messrs. D. M. Storrar, Abergavenny; J. Dow and J. M. Stewart, Swansea; E. Sayer, Newport, Mon.; J. Temple, Aberaman; J. B. Muter, Bridgend; W. J. Edwards, Neath; G. H. Simpson, Barry; J. L. Perry and A. C. Stewart, Cardiff.

On the proposition of Mr. Sayer, Mr. Storrar was voted to the chair.

Letters were received expressing approval of the formation of a Society, and promising to become members, from Messrs. Williams, Abergavenny; Cook, Small and Hughes, Swansea; Moir, Cardiff; Smith, Chepstow; Barling, Monmouth; Whepham, Cowbridge, and Rees, Brecon.

It was decided to form a Veterinary Medical Association, and that the title should be "The South Wales and Monmouthshire Veterinary Medical Association."

The following gentlemen were elected officers of the Society:—

President—Mr. D. M. Storrar, Abergavenny.

Vice-Presidents—Mr. J. Dow, Swansea; Mr. C. Moir, Cardiff; Mr. J. Temple, Aberaman.

Treasurer—Mr. E. Sayer, Newport, Mon.

Secretary—Mr. A. C. Stewart, Cardiff.

Auditors—Mr. J. M. Stewart, Swansea; Mr. J. L. Perry, Cardiff.

Rules were drawn up regulating the Society, and it was decided to hold two meetings annually, the General Meeting in Cardiff, on the first Thursday in March, and the Second Meeting in Swansea, in the autumn.

The Secretary intimated that he had been in communication with Professor Pritchard, acquainting him of the proposed formation of the Society, and requesting him to read a paper at the first General Meeting.

He then read the Professor's reply, consenting to address them.

A vote of thanks to the Chairman and Secretary for their services in instituting the Society terminated the meeting, which was very enthusiastic, and augured well for future success.

A. C. STEWART, *Secretary.*

ONTARIO VETERINARY COLLEGE.

December Examinations.

The official Board of Examiners met in the College on the 23rd of December. There were present J. H. Wilson, V.S., W. Cowan, V.S., C. Elliott, V.S., J. O'Neil, V.S., W. Shaw, V.S., T. Loyd, V.S., C. Sweetapple, V.S., and J. T. Duncan, M.D., F.S. Those presenting themselves were subjected to a thorough and careful examination. The following gentlemen passed and were awarded the diploma of the Government, entitling them to practise as veterinary surgeons:—Edgar A. Bogart, Kettleby, Ont.; Thomas H. Brooke, Don, Ont.; George C. Brownridge, Brampton, Ont.; James Conrad Carter, Gowanda, N.Y.; James H. Chesney, Brucefield, Ont.; John M. Colvin, Wingham, Ont.; Thomas A. Corsant, Ilderton, Ont.; Adam Elgas, Hartford, Mich.; William Elliott, Delhi, N.Y.; Joseph Fotheringham, Mason City, Iowa; George H. Gibb, St. Mary's, Ont.; Richard T. Kidd, Listowel, Ont.; John Edwin Law, Ithaca, N.Y.; Charles F. Leslie, York, Neb.; B. B. Myers, Linville, Va.; Bernard R. Poole, England; Robert E. Stevenson, Toronto, Ont.; Jacob Wilhelm, Shakespeare, Ont.; Louis A. Willson, Eglington, Ont.; George E. Young, Toledo, Ohio.

The following have passed primary examinations only in the subjects stated:—Asa A. Brown, Alfred T. Goldie, in anatomy; Horace Panet, James A. Wake, in materia medica.

On the following day, the annual meeting of the Ontario Veterinary Medical Association took place. The retiring President, W. Gibb, Esq., V.S., of St. Mary's, took the chair. There was a large gathering of members and visitors, among whom may be mentioned Professor James Law, of Cornell University, Ithaca, N.Y.; W. Kidd, V.S., of Listowel; Dr. Thorburn and Dr. Duncan, of Toronto; W. Shaw, V.S., of Dayton, U.S.A.; and D. McArthur, V.S., of Ailsa Craig. Among the professional matters discussed was a paper on "Hog Cholera," by W. Cowan, V.S., of Golt, and one on "Poisoning by Castor Oil Bean," by W. Wende, V.S., of Buffalo, N.Y.

After the more purely professional part of the programme was finished, a general discussion sprang up on the progress of our Society, when a very general desire was expressed to have a summer meeting. It was determined to hold such a meeting in June, in the City of London, Ontario. To this meeting all members of our Society, and all who would like to join, are cordially invited. The newly elected President, D. McArthur, Esq., V.S., of Ailsa Craig, was then escorted to the chair, thanked the meeting for the honor done him, and after disposing of routine business, adjourned the meeting.

SOUTHERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

A meeting of the above Association was held at the "First Avenue Hotel," Holborn, on Sept. 23rd. Owing to the absence through ill-health of the President, J. F. Simpson, Esq., was elected as Chairman. The members present were Messrs. F. Raymond, A.V.D., Wragg, A. C. Piesse, W. A. Edgar, T. B. Goodall, J. D. Barford, Prof. F. Smith, A.V.D., and the Hon. Sec.

Numerous letters and telegrams were read from members regretting their inability to attend. Among those present as visitors were Messrs. H. W. Singleton, Wm. Wright, S. H. Slocock, J. A. Woods, A.V.D., W. S. Adams, A.V.D., and W. Hunting.

Mr. E. W. Baker, of Wimborne, was elected a member of the Association. Mr. J. T. Burden, of Beaulieu, was nominated a member of this Association.

Mr. EDGAR, of Dartford, exhibited the spleen of a horse which gave the appearance of having been ruptured and to have subsequently healed. The death of the horse, which occurred that morning, was due to rupture of a large blood-vessel in the chest, and he did not consider the condition of the spleen to be in any way connected with the death of the animal.

Mr. HUNTING said he had observed this condition, and he might mention that the horse slaughterers in London recognised it as not uncommon.

Prof. SMITH had seen several cases very similar, especially in India. At first he considered them as cicatrices of former rupture, but he had come to the conclusion that rupture of the spleen could hardly be of so frequent an occurrence without the animal showing some unmistakable signs of ill-health.

Mr. GOODALL showed some well prepared specimens of horses' skulls, illustrating the development of the teeth and in one case disease of the superior maxillary bone, owing to the non-shedding of the anterior molars, a defect he had often noticed in three-year-olds.

He was induced to bring these specimens, bearing in mind that Professor Smith was to lecture on the Facial Sinuses, diseases in which he thought the teeth often played a prominent part.

The Diseases of the Facial Sinuses of the Horse.

By Prof. F. SMITH, A.V.D., Aldershot, Army Veterinary School, read the following paper.

I am very sorry that some of the specimens I have here are not in very good condition. They are not perfectly prepared. That is my misfortune rather than my fault. Still I brought them because they illustrate several conditions, both anatomical and surgical, which I have to bring before you this evening.

We can understand the solids and the fluids of the body becoming diseased, but one would almost have thought that the cavities of the body might to a certain extent have claimed exemption. We know, however, that whether the cavity is lined by a serous or mucous membrane that it has no exemption from disease. In the chest or peritoneal cavity we know that inflammation is frequently followed by an effusion of serum; and in the cavities of the head, a mucous or muco-purulent collection is the outcome of inflammation of the extension of the pituitary membrane. I suppose, however, before going on to a consideration of the surgery of the facial sinuses, to take you somewhat over the ground which we have all gone over in days gone by, namely, the anatomy of the parts. According to anatomists we have five sinuses on either side of the head, but I should like particularly to point out that although, anatomically, we have all these sinuses, yet I would rather, from a surgical point of view, say we have two large sinuses on either side of the head; the upper of which lies beneath the frontal and a portion of the nasal bones, and extends into the sphenoid; and the lower occupying the inferior half of the superior maxillary bone, and extending into the lower turbinated bone. I think, for surgical purposes, that is sufficient for our requirements, because we certainly observe, where we have a disease affecting the superior maxillary bone, that, in almost every case, the frontal head is also affected. The specimen which I exhibit shows very clearly indeed the arrangement and position of these sinuses, the upper of which extends underneath the frontal, and for some distanee under the nasal bones; has a very large and most extensive communication—with the upper part of the superior turbinated bone, and also communicates with the whole of this superior maxillary bone; excepting its most anterior part. It is no doubt a most extensive sinus, and, moreover, posteriorly, it communicates with the sphenoid and the upper part of the ethmoid bones. Our lower sinus is separated most distinctly from our upper by a very delicate

plate of bone, which is usually found opposite to the 4th and 5th molar teeth. Anatomists have described this as the inferior maxillary sinus, and it communicates with the lower turbinated bone. I do not think anatomists make it perfectly clear that the upper sinus in a horse's head communicates with the upper portion of the turbinated bone. I think it is of importance because it is one of those parts we must certainly be able to get at in order to cure the condition which is spoken of as nasal gleet. The same membrane lines all these parts, and the diseased procsss will extend into them with equal facility, so that our treatment must be as thorough as possible it we are to reach these cavities. The upper part of the superior turbinated bone communicates with the upper sinus, and the upper part of the inferior turbinated bone with the lower sinus. All are lined with a mucous membrane which is a reflection of that which lines the inside of the nostrils, and which passes through a common opening in the middle meatus. This common opening is generally opposite the 4th and 5th molar teeth; it is very small in the fresh specimen and sometimes you have the very greatest difficulty in getting even a probe into it. It is never sufficiently large to be seen unless you push aside the turbinated bones, when two depressions are visible, one of which corresponds with this opening. Why I particularly dwell upon this—is this—that I shall have in a few minutes to talk about the treatment of this disease, and when I see men syringing solutions up the nostril with the object of getting into these cavities, and I know that 25 minutes' hard work is entailed to expose that opening, I say to myself, how is it possible that these remedial agents can find their way into these large air sacs inside the horse's head? In other words I hold that it is an absolute impossibility for any agents injected up the nostril to find their way into the upper or lower sinus. As to the use of the facial sinuses, perhaps we are correct in saying that their great object is to afford a certain amount of bulk; and by the fact that they are filled with air, they enable the horse's head to be of due proportion, without excessive weight. We have other diseases which I shall only touch upon this afternoon, and which are not of the same practical importance owing to their rarity. For instance (specimen exhibited) here we have the case of a bony tumour of the antrum, the principal maxillary sinus, producing an enormous amount of disturbance and disfigurement. Here is a drawing I made of this horse, which will give one some little idea of the amount of disfigurement which existed during life. This enormous bony growth impinged to such an extent upon the eye-ball that the animal never opened his eye at all. If you look at the orbit, you will see how it is impinged upon by the bony growth. I take it that had surgical treatment been adopted in the earlier stage, the probability is that animal might possibly have recovered; at any rate one could have done no harm by opening the sinus, and having a look. I only saw this horse after the disease was so far advanced that it was quite clear the case was beyond the help of surgery. Conditions which give rise to a certain amount of trouble are those that we have to deal with in connection with the teeth. Here I have a case (specimen) of a horse which was kicked upon the face, a depressed fracture of the maxillary bone resulting. He eventually became paralysed without apparent reason. I can only bring this statement forward as an illustration of how one may do a very considerable amount of harm by not operating, in the same way as one may also inflict considerable damage by needless interference. Had I extracted the 5th molar tooth the probability is that the paralysis, which, possibly, was reflex, might have been cured. You will see, on looking at this specimen, that the upper portion of the tooth is fractured, and a very considerable amount of disease has been going on, and keeping up the discharge which came through the nostrils. Here is a case where surgical interference might have been of very great value.

We now come to deal more particularly with the disease known as nasal gleet, a collection of fluid or pus in these sinuses. As to the cause which are likely to bring this about, I think, perhaps, the most common is the extension of an ordinary catarrh. An ordinary cold is very readily extended from the nostrils into the facial sinuses. We know perfectly well that common condition in ourselves, in which having an intense cold we feel it in the sinuses, producing a feeling of heaviness, an aching in the head, and due to extension of the diseased process from the nostrils into the facial chambers; and I have no doubt whatever in my mind that the process can readily be extended, by means of the communication which we spoke of a minute or two ago, viz., the common opening in the middle meatus. But we have other causes which undoubtedly operate in producing the condition of which we speak. Injuries to the front of the face to which horses are very liable, are not at all uncommon causes; but I must confess I have had many cases of nasal gleet with extensive bone disease, which I could not attribute to either injury or accident. Therefore, there are other causes of which I have no cognisance whatever, but which are distinctly operating in the production of this condition. Neither the 1st, 2nd, nor 3rd molar ever enters into any part of the facial chambers of the horse. It is only the 4th, 5th or 6th, and not very much the 4th. Therefore the disease of the 4th, 5th, or 6th tooth may be also a cause of nasal disease. Mr. Goodall, when I was speaking about this a few minutes ago, remarked upon the commonness of disease of the 4th molar tooth, and although my experience of the teeth is not very great, it certainly fits in with his idea that the 4th is more commonly diseased than any other. It is the oldest tooth in the head, and consequently is more prone to undergo certain changes, at any rate it is a point worth bearing in mind, that where we have any injury or disease of the 4th, 5th, or 6th molar, it may also be a cause of disease in the sinuses into which they extend. It is hardly necessary for me to take you in detail over the symptoms of this disease. In the earlier stages the discharge is from one nostril only—occasionally fetid, and often tinged with blood; these symptoms are followed by a bulging of the bones of the face, and perhaps by dulness on percussion. I have met with very many cases indeed where there has been no dulness whatever on percussion, where the diagnosis was attended with extreme difficulty, and the only way I can account for these differences is that the sinus must be quite full of fluid in order to give any dulness whatever on percussion; and if you consider that the opening into the nasal chamber is distinctly below the level of the frontal sinus there has to be some obstruction between the sinus and the cavity of the nostril to enable any of these places to become quite full of fluid. You may have a very considerable amount of tympany existing over your lower sinus, and yet it may be very much affected, simply because the fluid is discharged as fast as collected. Where, however, the obstruction exists (and the case just exhibited is an example of such an obstruction), then undoubtedly, your sinus would become filled from its extreme lower to its extreme upper part, and so you would have a considerable amount of dulness. Dulness on percussion I place no reliance on whatever. There are other symptoms, perhaps, which one might be inclined to lay a certain amount of stress upon, for instance, an increased discharge from feeding a horse on the ground. We may have a certain amount of glandular enlargement, which may very reasonably be expected, but it is not of a specific character, and is simply the outcome of a very considerable amount of irritation. We may have, in long continued cases bulging of the bones of the face, when of course the thing is so palpable that "he who runs, may read." At any rate those of us who are in the service ought to have no bulging of this kind; but as we get our cases earlier than those who are engaged in private practice, I can quite understand one may have a considerable run of cases with bulging of the face, inasmuch as there is a very large

proportion of owners who would put off taking their horses to the veterinary surgeon rather than incur expense. Bulging of the bones of the face may be so marked that as in a case on which I operated some years ago there was nothing but skin to open. In that case the absorption of the maxillary bone was so complete that nothing but skin was left, and I believe, had I left the case for a day or two longer it would have saved me a certain amount of trouble, by bursting. As a rule one side of the face only is diseased, but I have witnessed a double affection, and such a case is exceedingly difficult indeed to deal with. Now, as to the diagnosis; I hold that the only method on which reliance can be placed is by means of that exceedingly useful little instrument, the gimlet, and I believe that any man who keeps a horse on his hands with a discharge from the nostril—a discharge of a non-specific character, which is not likely to make him feel anxious; if he keeps that horse on his hands without putting a gimlet in his head, he deserves all the trouble he gets. The longer those sinuses are bathed in pus, the more difficult will the case become. Therefore, I hold that in all these cases in which there is anything like a persistent discharge from the nostril, especially if associated with the slightest trace of smell, one ought to bore a hole in his head at once. Put in a gimlet, which is practically the exploring needle, and the whole tale will be out at once. We know perfectly well that a gimlet placed in a healthy head, is withdrawn with nothing but a little blood on it; on the other hand, if you have pus inside that sinus, your gimlet comes back filled with pus. Our methods to adopt are then perfectly clear. All persistent discharges from the nostril are no doubt very suspicious, and no man ought to allow a case of persistent discharge to remain on his hands without making up his mind. He should do something to the sinuses towards placing them beyond suspicion. You have only got to open the lower part of the upper sinus and, if the horse has any pus in his head you will certainly discover it. I have divided the treatment of this affection into medical, and surgical.

Medical treatment, I would rather have nothing to say about, because I hold exceedingly strong views. I certainly think no man has a right to tinker—that is the word to use here—with a horse by injecting material up his nostrils when he has got pus inside his head. That pus ought to be allowed to find its way out, just in the same way as you would no more think about tinkering with an abscess, but when it was mature, you would know that the thing treated on ordinary surgical principles would do well. If a sinus or its membrane is kept constantly bathed in this discharge, the longer operation is put off the more difficult will the case be to cure. Then that nasal insufflator—I don't know any instrument which rouses my ire more than that; I am now speaking of course solely of the treatment of disease of the sinuses. It may be exceedingly useful indeed for diseases of the Schneiderian membrane, or anything of that sort, but the idea of snuffing up powder in order to be able to cure inflammation existing in the enormous cavities of the face is to my mind puerile in the extreme. So in the same way, blistering. I cannot conceive that any good can be done by blistering. If you have made up your mind ou the matter, there is only one thing to do, viz., the sooner you let the pus out the better, and blistering it may be useful after you have trephined, but with the object of putting off the evil day—the day of operation—I hold to be entirely wrong. I have put here in my notes—"Medical treatment is loss of valuable time"; it is temporising with the case; it is converting a curable into probably an incurable condition." Now, as to the surgical treatment. The surgical treatment of course is very simple indeed. We know pretty well the distribution of our sinuses. We know where we can get an opening, and all we have got to do is boldly saw out the piece of bone and practically cure our patient in the majority of cases.

(To be continued.)

NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.—List of Subscriptions for the Year, 1891.

Jan.	1.	Mr. C. R. Trigger	0	10 6
,,	4.	Mr. John Freeman	0	10 6
,,	6.	Mr. James Rowe	0	10 6
,,	6.	Mr. Wm. Shipley	1	11 6
,,	8.	Mr. B. Cartledge	0	10 6
,,	8.	Mr. R. Cartwright	0	10 6
,,	8.	Mr. W. H. Caton	0	10 6
,,	8.	Mr. C. Hartley	0	10 6
,,	8.	Mr. Wm. Carless	0	10 6
,,	8.	Mr. R. C. Edwards	0	10 6
,,	9.	Mr. Hy. Thompson	0	10 6
,,	9.	Mr. J. M. Axe	0	10 6
,,	9.	Mr. C. Sheather	0	10 6
,,	9.	Mr. E. Kitchen	0	10 6
,,	9.	Mr. Batt and Son	1	1 0
,,	9.	Mr. R. Reynolds	1	1 0
,,	9.	Mr. C. W. Elam	0	10 6
,,	9.	Mr. A. L. Gibson	0	10 6
,,	9.	Mr. W. Whittle	0	10 6
,,	9.	Mr. T. D. Lambert	0	10 6
,,	9.	Mr. F. G. Samson	0	10 6
,,	9.	Mr. E. Nuttall	0	10 6
,,	10.	Mr. Wm. Bowers	0	10 6
,,	10.	Mr. Hy. J. Hogben	0	10 6
,,	10.	Mr. A. H. Jacobs	0	10 6
,,	10.	Mr. J. W. Anderton	0	10 6
,,	10.	Mr. J. E. Scrivins	0	10 6
,,	10.	Mr. Prof. Walley	0	10 6
,,	10.	Mr. Roalf Cox	0	10 6
,,	10.	Mr. J. C. James	0	10 6
,,	10.	Mr. T. Riddler	0	10 6
,,	10.	Mr. J. Wolstenholme	0	10 6
,,	12.	Mr. J. H. Goodall	0	10 6
,,	12.	Mr. G. H. Leach	0	10 6
,,	13.	Mr. W. H. Webb	0	10 6
,,	13.	Mr. G. E. Bowman	0	10 6
,,	13.	Mr. G. Morgan	1	1 0
,,	13.	Mr. E. Beddard	0	10 6
,,	16.	Mr. T. Aubrey	0	10 6
,,	16.	Mr. C. Morgan	0	10 6
,,	17.	Mr. F. W. Wragg	0	10 6
,,	20.	Mr. F. Danby	0	10 6
,,	21.	Mr. F. J. Stanley	0	10 6
,,	21.	Mr. B. Russell	0	10 6
,,	21.	Mr. T. A. Frost	1	1 0
,,	21.	Mr. T. E. Augars	0	10 6
,,	21.	Mr. W. Woods	0	10 6
,,	21.	Mr. S. Locke	0	10 6
,,	23.	Mr. T. Barker	0	10 6
,,	23.	Mr. W. Root	0	10 6
,,	23.	Mr. J. Storrar	0	10 6
,,	23.	Mr. T. A. Frost	0	10 6
,,	24.	Mr. E. Faulkner	0	10 6
,,	29.	Mr. G. A. Banham	0	10 6
,,	29.	Mr. Finlay Dun	0	10 6
Jan.	29.	Mr. T. Collins	0	10 6
,,	30.	Mr. W. F. Peacock	0	10 6
Feb.	6.	Mr. J. H. Ferguson	0	10 6
,,	6.	Mr. A. W. Mason	1	11 6
,,	6.	Mr. J. Woodger	0	10 6
,,	6.	Mr. T. D. Broad	0	10 6
,,	14.	Mr. T. A. Dollar	0	10 6
,,	14.	Mr. J. S. Carter	0	10 6
,,	14.	Mr. C. Moir	0	10 6
,,	14.	Mr. J. L. Perry	1	1 0
,,	14.	Mr. W. A. Field	0	10 6
,,	19.	Mr. R. Mackinder	0	10 6
,,	21.	Mr. G. Rugg	0	10 6
,,	23.	Mr. D. Charnock	1	11 6
,,	26.	Mr. O. G. Barrow	1	0 0
,,	26.	Mr. E. Woodger	1	11 6
Mar.	10.	Mr. T. Secker	0	10 6
,,	11.	Mr. T. Hopkins	0	10 6
,,	11.	Mr. C. Blackhurst	1	11 6
,,	17.	Mr. A. G. Barrow	0	11 6
,,	18.	Mr. Ball & Son	1	1 0
,,	18.	Mr. Wm. Dobie	0	10 6
Apr.	1.	Mr. J. & A. Lawson	1	1 0
,,	13.	Sir F. Fitzwygram (donation)	1	0 0
,,	13.	Mr. H. Snary	1	11 6
,,	28.	Mr. J. D. Overed	0	10 6
May	12.	Mr. Isaiah Leather	1	1 0
June	11.	Mr. T. A. Rudkin	1	11 6
,,	11.	Mr. Henry House	1	11 6
,,	11.	Mr. W. G. B. Dickinson	1	11 6
,,	11.	Mr. F. Freer	1	11 6
,,	12.	Mr. T. B. Tutt	1	1 0
,,	12.	Professor Williams	0	10 6
,,	12.	Mr. J. B. Taylor	0	10 6
,,	12.	Mr. G. A. A. Oliver	0	10 6
,,	12.	Mr. A. Over	0	10 6
,,	12.	Mr. T. Pratt	0	10 6
,,	12.	H. Olver	0	10 6
,,	19.	Mr. J. L. Barling	0	10 6
July	3.	Mr. P. Taylor	0	10 6
,,	3.	Mr. A. Taylor	0	10 6
,,	6.	Mr. J. B. Tutt	0	10 6
,,	8.	Mr. T. Simpson	1	11 6
,,	8.	Mr. T. Barker	0	10 6
Aug.	8.	Mr. H. R. Perrins	1	1 0
,,	8.	Mr. J. Jackson	0	10 6
,,	31.	Mr. T. G. Chesterman	0	10 6
Sept.	8.	Mr. T. Greaves	0	10 6
,,	8.	Mr. T. W. Cave	0	10 6
,,	24.	Mr. J. H. Ferguson	5	0 0
Oct.	9.	Mr. H. D. Charlton	1	11 6
,,	10.	Mr. G. Morgan	0	10 6
,,	27.	Mr. O. T. Williams	1	1 0
			£80	11 0

THE VETERINARY MUTUAL DEFENCE FINANCIAL STATEMENT.

FROM JANUARY 1ST TO DECEMBER 31ST, 1891.

Cash Received.	£	s.	d.
Balance in Bank, January, 1891	159	19	9
Subscriptions in 1891 ..	79	11	0
Bank Interest, June and December	2	4	11
	£241	15	8

Cash Paid.	£	s.	d.
January 14th—Overpaid into Bank, last settlement	3	9	6
January 14th—By Cash to G. Morgan	3	4	0
May 1st—Cash to Lawson Smith against J. H. Ferguson	54	16	2
October 10th—G. Morgan, Secretary's Expenses	0	13	3
October 10th—G. Howdin, Printing Rules.. ..	2	8	6
November 26th — Hotel Bill for use of Room on several occasions ..	1	7	6
December 3rd — Cobbet and Wheeler, Bill ..	0	6	8
December 31st—Cash in Bank	157	19	6
December 31st—Cash in hand	14	0	4
December 31st—Twelve monthly stamps, wrappers, &c.	3	10	3
	£241	15	8

Audited and found correct, January 8th, 1892. JNO. B. WOLSTENHOLME.
EDWIN FAULKNER.

THE NATIONAL VETERINARY BENEVOLENT FINANCIAL STATEMENT.

FROM JANUARY 1ST TO DECEMBER 31ST, 1891.

Cash Received.	£	s.	d.
Balance in Bank, January 1891	46	4	7
Cash in hand at that date	0	10	0
Sir F. Fitzwygram's donation	1	0	0
Four Dividends, Mersey Dock..	73	7	4
Bank Interest, June and December	1	10	5
Two Dividends, Corporation, Manchester ..	26	9	4
Cash in Mersey Docks ..	1900	0	0
Cash in Corporation, Manchester	900	0	0
	£2949	1	8

Cash Paid.	£	s.	d.
December 31st—Cash in Bank	148	1	8
December 31st—Cash in Mersey Docks.. ..	1900	0	0
December 31st—Cash in Corporation, Manchester	900	0	0
December 31st—Stamps, Wrappers, &c... ..	1	0	0
	£2949	1	8

Audited and found correct, January 8th, 1892.
JNO. B. WOLSTENHOLME.
EDWIN FAULKNER.
THOMAS GREAVES, *Hon. Treasurer.*

REPORT OF A MEETING OF THE WORKING COMMITTEE OF THE J. H. STEEL MEMORIAL.

A MEETING of the Working Committee of this Fund was held at 10, Red Lion Square, on the 21st January, Mr. J. Roalfe Cox in the chair.

Messrs. Fleming & Wragg, the Treasurers, reported that the funds in their hands amounted to £245 4*s*.

It was decided that the fund should be closed on the 1st of March next, and that a meeting of the General Committee, and a General Meeting of all the subscribers be summoned for the 8th of March.

In order that expenses should be kept down as much as possible, the Hon. Secretary was directed to summon these meetings through the kind offices of the Editors of the professional Journals, and not by circular.

The names of those gentlemen who had not yet redeemed promises were read out, and the Hon. Secretary was directed to communicate with them.

Arrangements were made for the preparation of a short report for the information of the subscribers, indicating the labours of the working Committee.

The Chairman read a letter from Mr. Banham, in the matter of a sum of £60, the surplus of subscriptions to the National Veterinary Congress of 1881. From this letter it appeared that Mr. Banham would be glad to hand the money over to the Steel Memorial Fund, providing he was guaranteed against any future loss or annoyance, which might arise in connection with the money.

The working Committee considered that Mr. Banham was exercising reasonable caution, and upon the suggestion of Dr. Fleming, C. B., (late President of the National Veterinary Congress of 1881), it was arranged that a request be forwarded to Mr. Banham, in his capacity of Hon. Secretary, asking him to call a meeting of the surviving members of the Congress, in order that some decision might be arrived at which would protect him from all risk in the matter. With a vote of thanks to the Chairman, the Committee adjourned.

F. RAYMOND, *Hon. Sec.*

Army Veterinary Department.

Gazette, December 29th.

YEOMANRY CAVALRY. Staffordshire (Queen's Own Royal Regiment). Veterinary-Lieutenant G. H. Watkins resigns his Commission.

Gazette, January 5th.

VETERINARY DEPARTMENT.—Thomas Jordaine Stanley Clarke, Gent., to be Veterinary-Lieutenant on augmentation.

Obituary.

WE regret to have to announce the death, from acute phthisis, of Thomas Caldecott, M.R.C.V.S., which took place recently at his home in Knutsford, Cheshire. Mr. Caldecott graduated in 1880, and entered the Army Veterinary Department in that year, serving in India, South Africa, and England, until he retired about a year ago. Subsequently he obtained an appointment in Singapore, but this he only held for a few months, when he was compelled to return home because of the illness which proved fatal soon after his arrival.

The following deaths have been reported during the month :—

J. Thomson, M.R.C.V.S., Lochee, Forfar.	Graduated in ..	1841
T. Plews, M.R.C.V.S., Stockton-on-Tees	„ ..	1831
W. Hall, M.R.C.V.S., Goxhill, Hull	„ ..	1853
J. Morphy, M.R.C.V.S., Armagh	„ ..	1862
A. McArthur, M.R.C.V.S., Largs, N.B., H. and A. Society, 1863, R.C.V.S.		1883
J. Martin, M.R.C.V.S., Kells, Co. Meath.	Graduated in ..	1864
T. R. Scruby, M.R.C.V.S., Royston, Cambs	„ ..	1859
J. M. Gillingham, M.R.C.V.S., Croydon, Surrey	„ ..	1872
H. Bradley, M.R.C.V.S., Newry, Ireland	„ ..	1881

We were misinformed with regard to the death of Mr. Maynard of Romsey, which was announced in the January journal. We are glad to learn that he is alive and in excellent health.

Mr. Acton, whose demise was published at the same time, did not become a Fellow of the Royal College in 1884, but only a member, he having obtained the certificate of the Highland Society in 1870.

The Toulouse Veterinary School has lost one of its excellent teachers by the death of M. Soula, Professor of Clinic and Surgery, at the early age of thirty-five years. Serving in the army as Veterinary Surgeon, after graduating from that school, he soon left it to become *repétiteur* to the chair of Surgical Pathology at his *alma mater*. Four years afterwards he went to Guatemala, South America, to establish a veterinary school for the government of that country. Remaining there a year, he returned to the Toulouse School, and was soon promoted to the chair which he held at his death. He contributed some excellent papers to the *Revue Vétérinaire*, which testify to his zeal and ability.

Notes and News.

Supposed Outbreak of Rabies in France.—It is reported that an epizooty has been raging for some days amongst the animals in the commune of Pépieux (Carcassonne). Forty dogs and cats have been killed, and it is supposed that the sheep also are attacked with hydrophobia.

Abortion in Mares in South America.—From Buenos Ayres we learn that nothing as yet has been discovered which can be said with any certainty to be the cause of so many hundreds of mares slipping their foals all over the country. "Some say it is the state of the grass from the wet weather, others mere imitation, while the other day I heard from one whose opinion is worth a great deal, that he believed it be the result of an epidemic of influenza which is attacking the mares. Naturally, everything has been tried, and every precaution taken by breeders, but apparently without the least success, and thousands of foals must have been lost this season. On some estancias it seems all the common mares have slipped their foals and thoroughbreds have not; whilst again, on others the thoroughbred foals only have been lost, and in some cases every mare on the place has slipped."

Glanders in Australia.—The necessity for keeping a strict watch on the ports of Australia, so that diseases may be kept a distance, was very forcibly illustrated a few months ago at Sydney, when the Government Veterinarian discovered that some of the horses landed with Sells Brothers' circus were suffering from glanders and farcy. The mail steamer *Monowai* arrived there from San Francisco on Oct. 12th. She brought five elephants, two hippopotami, and other animals forming an ordinary menagerie; but some of the

animals which belonged to the show were left behind, the reason given being that the quarantine laws would not permit of their free entry into this port. There were brought thirty-nine horses and four ponies. All the animals on board the steamer were inspected, and as no disease was then noticeable the stock were landed, and taken to the circus site on Moore Park. Mr. Stanley, the Government Veterinary Inspector, fortunately considered a second inspection necessary, and a day after the horses were landed, discovered that one of the ponies had developed glanders. This animal was promptly removed to Rodd Island, and the Chief Inspector of Stock, Mr. Stanley, and two veterinary surgeons carefully inspected all the stock. It was found that one horse had glanders and another farcy. These affected horses were promptly destroyed, and all the remaining horses were taken to the Shark Island quarantine station, where they are at present under careful supervision.

HORSES OF THE BRITISH ARMY.—A recent return of the whole number of riding and draught horses and mules used in the British regular forces shows that the total is nearly 26,000, of which 15,000 are on the British establishment, and the remainder on the Indian, the latter being exclusive of the horses used by the native Indian cavalry regiments. The household and line cavalry naturally take a larger portion of the total than any other branch of the army; but the 12,000 which they absorb are only sufficient to mount less than two-thirds of the non-commissioned officers and men, who are in round numbers 18,500. The artillery have 11,000 horses and mules, of which 3,000 are for riding, about 150 pack mules used in the mountain batteries, and the rest form the gun and waggon teams. The field batteries take the largest number of horses in the artillery, close upon 8,000; but the horse batteries have a very large proportion, all the gunners being mounted, and for this and team purposes nearly 3,000 are used. The large body of garrison gunners need but few animals, and about 100 cover their ordinary requirements. The Royal Engineers have only about 400 horses for all purposes, and the Foot Guards and Infantry some 800 for transport and other objects, including mounted infantry; but the greater number of the infantry battalions have no permanent transport animals, and are constantly passing those they have from one corps to another for training purposes. The Army Service Corps have some 1,500 horses for their thirty-seven companies, 500 being for riding, and the others for draught and use as pack animals. In India the European cavalry have 4,500 horses, and the artillery 6,500.

Correspondence.

MELTING SNOW IN THE STREETS.

SIR,—There has been, this winter, the usual crop of inventors who, without the slightest knowledge of the subject they advocate, endeavour to enlist the time and money of others, as ignorant as themselves, in a very foolish scheme, *i.e.*, to use ordinary gas to melt the snow which obstructs the streets, some of the sanguine having gone to some expense in demonstrating what was already known, *i.e.*, the possibility of it irrespective of cost.

How absurd such a project is can be easily seen by comparing the known heating value of coal gas with the work to be done.

Six inches deep of average snow, when melted, becomes half an inch depth of water, 24 square feet of which will weigh 62½ lbs., or 23·4 lbs. per square yard. At this rate the snow on one mile (or 1,760 yards) of a street 20 yards wide would, if 6 in. deep, weigh 823,680 lbs. or 363¼ tons.

The heating power of London gas is 660 units per cubic foot, *i.e.*, one cubic foot of coal gas will heat 660 lbs. of water 1° Fahrenheit, and of this we may take it as a maximum that 500 units could be utilized.

It has been proved repeatedly and beyond question that 1 lb. of snow at freezing point requires 150 units of heat to melt it and raise the temperature of the water obtained to 40° Fahrenheit, and this effect would be produced on $3\frac{1}{3}$ lbs. of snow by the consumption of one cubic foot of coal gas. From the above data it will be found that to melt the snow in the assumed mile of street would require the consumption of two hundred and forty-seven thousand cubic feet of gas, costing, at 3/- per 1,000 cubic feet, a little over £37, or at the rate of £3,256 per square mile.

As there are a great many square miles of streets in many towns, and as the snowfall has already been nearly double that assumed, it will be seen that the problem is, most certainly, not one to be solved by this method. Even if we were to assume that the cost of gas and labour was not prohibitive, the fact that the ground itself is usually colder than 32° must be considered, and the ground would also have to be warmed, or a thin surface of glassy ice, of the most slippery and dangerous kind, would remain after the snow was removed; this alone would condemn the project as being unworthy of consideration.

THOMAS FLETCHER, F.C.S.

Warrington.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from T. Greaves, Manchester; H. G. Rogers, London; T. Bowhill, Edinburgh; R. W. Burke, A.V.D., Ambala, India; T. Hopkin, Manchester; Professor Bang, Copenhagen; R. Rutherford, Edinburgh; W. Awde, Barnard Castle: P. R. Gordon, Brisbane, Queensland; A. Green, Dudley; J. A. McLaughlin, Providence, U.S.A.; T. Fletcher, Warrington; F. C. Mahon, London; T. H. Merrick, Northampton; A. C. Stewart, Cardiff; A. W. Hill, London; W. H. Bloye, Plymouth; W. Maynard, Romsey; G. G. Mayor, Kirkham; Vet. Capt. F. Raymond, Woolwich.

BOOKS AND PAMPHLETS: *Dr. B. Bang*, Le Danger Supposé de la Consommation du Lait et de la Viande, etc., d'Animaux atteints de la Tuberculose; *Dr. J. Bayer*, Bildliche Darstellung des Gesunden und Kranken Auges Unserer Hausthiere; *J. Csokor*, Ueber die Tuberculose der Hausthiere; Procès-Verbal de l'Academie Royal de Médecine de Belgique; *G. Chenier*, Le Tondage du Cheval; *E. Dele*, Eloge de J. M. Wehenkel; Bulletin of the John Hopkin's Hospital; Bulletin des Séances de la Société Nationale d'Agriculture de France.

JOURNALS, ETC.: *Bacteriological World and Modern Medicine; American Veterinary Review; Moderno Zooiatro; Recueil de Méd. Vétérinaire; Journal de Méd. Vétérinaire et de Zootechnie; Journal of Comparative Medicine and Veterinary Archives; Clinica Veterinaria; Annales de Méd. Veterinaire; Thierarzt; Lancet; British Medical Journal; Mark Lane Express; Journal of the Royal Agricultural Society of England; Edinburgh Medical Journal; Echo Veterinaire; Live Stock Journal; Hygiene; Boletin Medico de Puebla*; Revue Vétérinaire.

NEWSPAPERS: *Times of India; Clapham Observer; Brisbane Courier; Western Times; Scotsman.*